PAINT and VARNISH Production

THE TECHNICAL MAGAZINE FOR MANUFACTURERS OF PAINT, VARNISH, LACQUER AND OTHER SYNTHETIC FINISHES

Improved NEVILLE 2-50-W Hi-Flash* Solvent brings you better finishes at lower cost

Neville's 2-50-W Hi-Flash Solvent has always been characterized as a superior, fully refined, water-white naphtha with a slow evaporation rate, good odor, high flash point and excellent solvency power. *Now, through improved control techniques, the solvency strength has been increased with no change in the product's low cost.*

And beyond solvency power, 2-50-W offers a number of other advantages to the manufacturer of alkyd finishes, aluminum paints, marine finishes, varnishes and enamels. It leaves no gummy residue to soften a finish, aids adhesion, hardens uniformly, and improves brushing, flowing and leveling characteristics. It aids in promoting surface tension control when used in aluminum paints, thereby promoting better leafing and leaf retention. 2-50-W is available for quick delivery in drums, transports or tank cars. For further information or a sample, please write.

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Neville Chemical Company

Pittsburgh 25, Pa.

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(alkyd emulsion)

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WATER-THINNED GLOSS ARCHITECTURAL FINISHES!

This new vehicle *now* makes possible water-thinned gloss architectural finishes with properties approximating those of *solvent-thinned* enamels.

Surface coatings formulated with 1505 SYNTHEMUL offer excellent adhesion, water resistance and mar resistance. Also, a lower percentage of vehicle can be used without loss of gloss, due to the new emulsion's greater pigment binding capacity. The resulting increase in the ratio of pigment to vehicle imparts improved hiding power to your product.

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PAINT and VARNISH

(REG. U.S. PATENT OFFICE)

Formerly PAINT and VARNISH PRODUCTION MANAGER
(Established in 1910 as The Paint and Varnish Record)

VOL. 48 JUNE, 1958 NO. 7

NEXT ISSUE

A quick and simplified method for the determination of thixotropic properties of paints will be presented in the July issue. This method is of particular help in determining the storage-stability of gelled paints.

FEATURES

Water Sorption of Mica in Latex Paints, *by Max Kronstein* 33
Petrochemicals for Paint, Part V, *A Staff Report* 41
Epoxy-Based Masonry Materials, Part II, *by Philip Maslow* 47
The Coating Corner, *by Phil Heiberger* 52

DEPARTMENTS

Comment 7
News 57
Zuck to Head Texas Container Firm 57
Infrared Spectroscopy Institute Scheduled 58
Bosch Accepts Post at U. of Missouri 58
New Vinyl-Type Coating Developed 59
New Raw Materials and Equipment 67
Automatic Micro-Printer 67
Acetate Solvents 68
Air-Powered Hoist 69
Patents 73
Wood Finishing Composition 73
Synthetic Drying Oils 73
Polytetrafluoroethylene 75
Personnel Changes 79
Abstracts 94
Technical Bulletins 101
Calendar of Events 105

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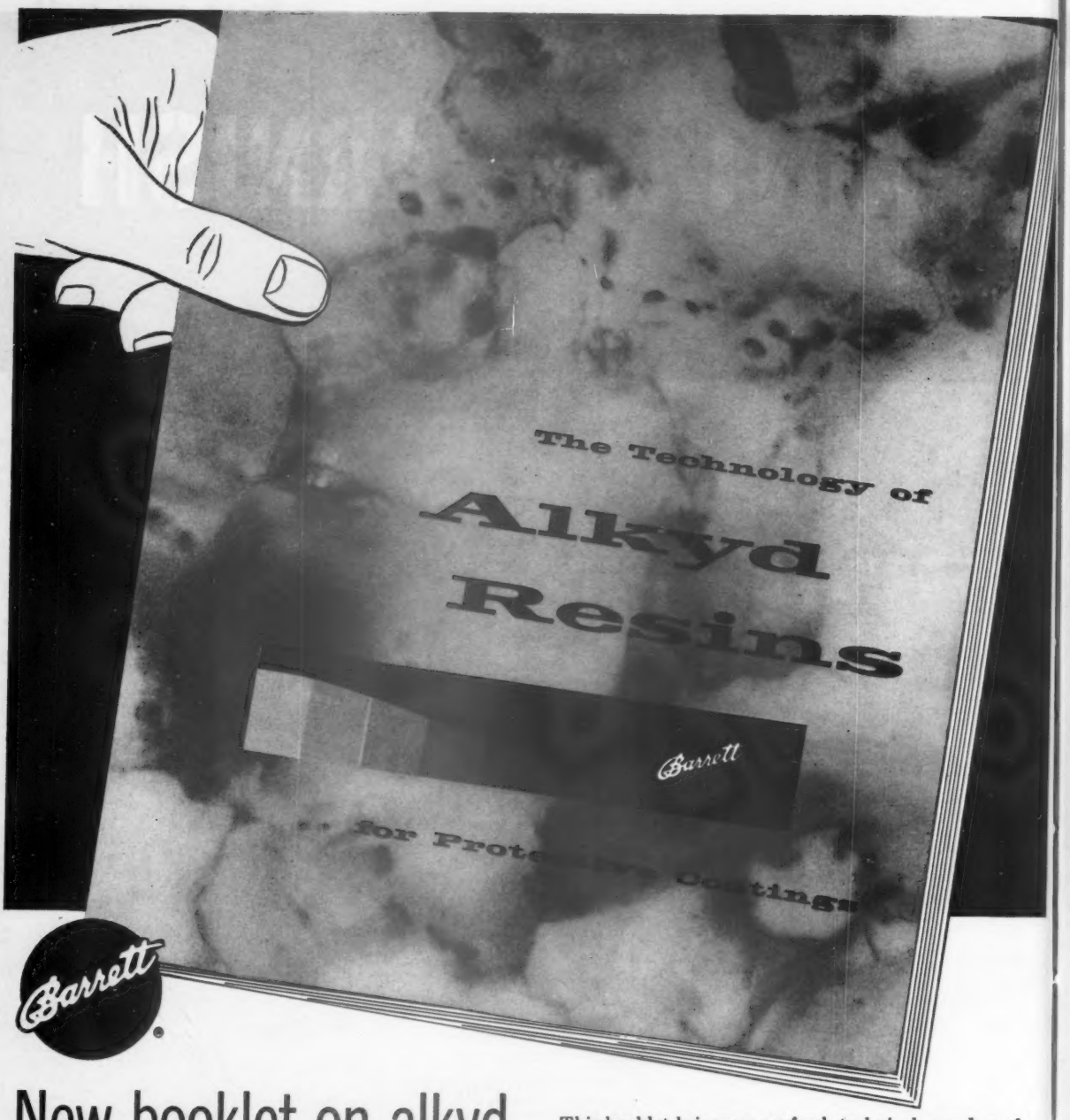

Barrett®

New booklet on alkyd resin technology

Now Barrett offers a brief, yet authoritative study of alkyd coating resins...their properties, manufacture and applications

This booklet brings you a fresh technical roundup of the facts on alkyd resins. It's a valuable reference work for those well acquainted with alkyds and, at the same time, the perfect summary for the newcomer to the field.

In it you'll find up-to-date information on raw materials, equipment and quality control methods... plus a representative coverage of typical formulations and related uses. For your copy, write (on company letterhead, please) to the address below.

BARRETT DIVISION

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WORLD'S LARGEST PRODUCER OF PHTHALIC ANHYDRIDE

Allied Chemical

Radiation and Paint

PAINT has often been considered as an engineering material. This is particularly true of product finishes which must meet certain specifications depending on the end-use of the product itself.

In recent years, the effects of nuclear radiation on the properties of various engineering materials have been described in the literature.

Recent work by the Wright Air Development Center at Wright Field, Ohio showed that all organic coatings undergo some change in properties when they are exposed to radiation. Describing this study in a recent issue of *Materials in Design Engineering*, it was pointed out that the extent of the change in properties of an organic coating depends on the nature and chemistry of the coating and the kind and dosage of radiation received.

Generally speaking, the action of radiation results in an increase or decrease in molecular weight of polymeric materials—making them more brittle or more fluid. It was found that molecules of an aromatic system are comparatively stable. A striking difference was also observed when different pigments are used with the same resin. For example, white titanium dioxide appears to accelerate radiation damage in nitrocellulose lacquers, and toluidene-red has little effect, whereas carbon black inhibits radiation change. It was noted that the resistance of organic coatings to radiation can be predicted to some degree from data available on polymers. In coatings, exact prediction cannot be obtained because of the introduction of complicating factors such as pigments, plasticizers, and other additives. Therefore, it is necessary to resort to laboratory testing for an evaluation of a coating's resistance to radiation.

In this study six different types of coatings were evaluated for radiation resistance. Of the six, the phenolic type showed little effect. This is in line with the above theory that the aromatic system is quite stable. Silicone modified alkyd enamel and straight alkyd enamel were next in order of radiation resistance, but intense exposure caused embrittlement of the both of these coatings. Epoxy, fluorinated vinyl coating, and nitrocellulose lacquer show severe degradation upon exposure to radiation.

While this study gives some indication of the behavior of certain types of coatings against radiation, it is apparent that each coating must be individually tested for a conclusive evaluation.

As an engineering material paint must fulfill many requirements, and radiation resistance is one requirement that is growing in importance in this age of space and atoms.

More Roads-More Paint

FEDERAL highway expenditures will be increased by $1.8 billion as a result of President Eisenhower's recent approval of the highway bill. This highway authorization measure raised the amount of spending on the over-all federal-state roads program to $5½ billion.

The paint industry stands to benefit immeasurably in this program for it has been estimated that painting a mile of 4 inch center stripes takes 17 gallons of enamel whereas a 6 inch stripe consumes 26 gallons. In addition significant quantities of paint will also be needed for metal parts of bridges, guard rails and traffic signs. Moreover, tons of glass beads will be required for road stripes plus gallons of silicone solution for preserving the cleanliness of concrete surfaces.

TARGET

... Quality Control

from FLAX to FINISH!

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- **UNIFORM QUALITY CONTROLLED**
- **DOUBLE FILTERED FOR PURITY**
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Write for complete information about these dispersed pigments—or call the GDC sales office nearest you.

GDC DISPERSED PIGMENTS INCREASE THE COLOR RANGE FOR EMULSION PAINTS

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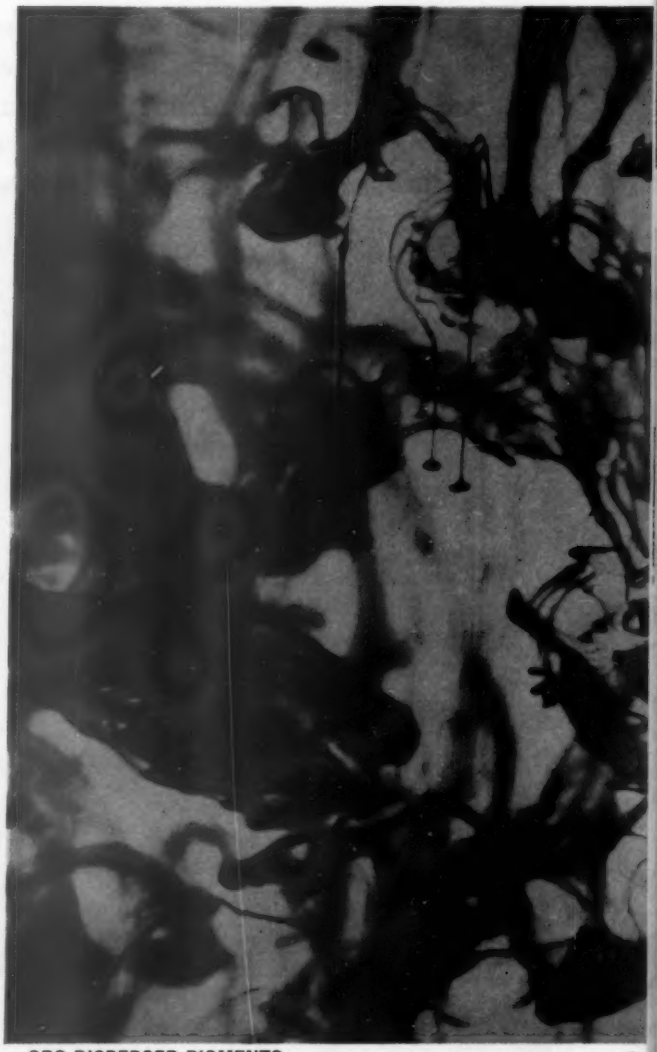

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FROM RESEARCH TO REALITY

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Excellent adhesion is just one of many things for which painters compliment makers of Lytron 680 based paints. The "secret" is in the controlled small particle size of this chemically unique acrylic-type polymer. It assures proper binding of high volumes of pigment, superior color retention, greater stability.

Painters also admire the ease of application with Lytron 680 based paints over porous or sealed surfaces. There's no spotting, no color mottling, no ruptures, minimum blistering even over green masonry. They like water resistance within 30 minutes, fast drying rate, easy clean-up. They like the idea of smooth films. (Lytron 680 can produce smooth films without modifications even below 40°F.!)

SPECIAL NOTE TO MANUFACTURERS OF INTERIOR PAINTS: Although Lytron 680 was developed as a binder for exterior paints, features have been incorporated which make it equally useful as a sole vehicle or as a modifier of other alkaline latex vehicles in high quality interior paints. Small quantities of Lytron 680 added to alkyd or styrene butadiene systems can improve early washability, adhesion, durability, flexibility. Be sure to investigate this low-cost way to gain the superior properties of Lytron 680. For added information on Lytron 680, write Monsanto Chemical Co., Surface Coating Resins Dept., Springfield 2, Mass.

Thanks for these "stick-to-itive" paints

Other Monsanto products for the surface coating industry include Amino Resins, Phenolic Resins, and Styrene Latices and Resins.

I understand they're based on Lytron 680*

Lytron 680

based paints have excellent adhesion even over glossy surfaces

Monsanto

*LYTRON: REG. U. S. PAT. OFF.

"Its Fast Grinding Cuts Our Costs."

HORSE HEAD® R-760 TITANIUM DIOXIDE

RUTILE

Maximum Chalk Resistance · Highest Tint Retention

Customers tell us that HORSE HEAD R-760 provides a combination of excellent properties for exterior finishes.

Paint chemists, who have been evaluating R-760 for many months, report that it imparts maximum chalk resistance, highest tint retention, and other essential properties in tinted exterior house paints, automotive finishes, and the like.

Production men tell us that the good mixing and grinding properties of R-760 enable them to cut their costs and increase output of exterior finishes.

Test HORSE HEAD R-760 now and take advantage of its many desirable properties.

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*As reported in Official Digest. Paint & Varnish Production Clubs. November 1956
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Tests prove AZODOX, new form of zinc oxide (de-aerated), to be superior in mixers and mills. Its high density, low bulk gives greater capacity, steps up production. *AZODOX incorporates better and faster in oil,* disperses completely.

AZODOX is available in all grades of American process lead-free zinc oxide.

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Completion of this plant will mark another important step in Witco's policy of providing industry with top quality chemicals backed by unsurpassed customer service.

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To make uniform paint products you need a uniform odorless solvent!

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ALWAYS UNIFORM! Phillips Soltrols assure uniform results. Every precaution is taken to protect the excellent physical properties necessary to assure you of uniformly good results at all times.

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FREE SAMPLES. We want you to test the Soltrols and see for yourself how they perform in your product. Send for your free samples today.

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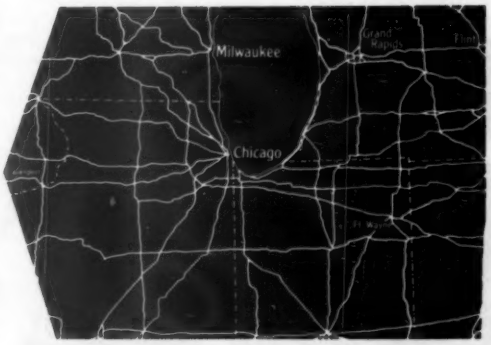

Are you taking advantage of this economical solvent?

If you are presently using n-butyl acetate you can, by switching to isobutyl acetate, save 14¢ a gallon, or more than $1,000 on every 8,000 gallon tank car. A medium-boiling lacquer solvent, isobutyl acetate can be used interchangeably with n-butyl acetate in most applications. In nitrocellulose lacquers, its substitution produces no significant change in handling characteristics or in film properties.

By replacing methyl isobutyl ketone with isobutyl acetate, you save 5¢ a gallon or $400 on every 8,000 gallon tank car. What's more, use of isobutyl acetate helps you achieve improved blush resistance.

If you are using n-butyl acetate with sec-butyl acetate or n-propyl acetate, the average cost per gallon, using isobutyl acetate alone, will probably be less than any usable combination of these solvents. In addition, you free a storage tank for other purposes.

Ask your Eastman representative to show you how use of isobutyl acetate in your formulations can reduce solvent costs, or write to EASTMAN CHEMICAL PRODUCTS, INC., Chemicals Division, KINGSPORT, TENNESSEE.

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CHEMICAL PRODUCTS, INC.
KINGSPORT, TENNESSEE
subsidiary of EASTMAN KODAK COMPANY

SALES OFFICES: Eastman Chemical Products, Inc., Kingsport, Tennessee; New York City; Framingham, Massachusetts; Cincinnati; Cleveland; Chicago; St. Louis; Houston. **West Coast: Wilson Meyer Co.,** San Francisco; Los Angeles; Portland; Salt Lake City; Seattle.

How Bert Rucinski makes ADM "Easy to Buy from"

● After washing 8,000 gallon tankcars and 4,000 gallon tank wagons all day, Bert Rucinski doesn't often complain about helping with dinner dishes. There's a running gag around his home that the king-sized "dishwasher" he operates on the job is making him soft.

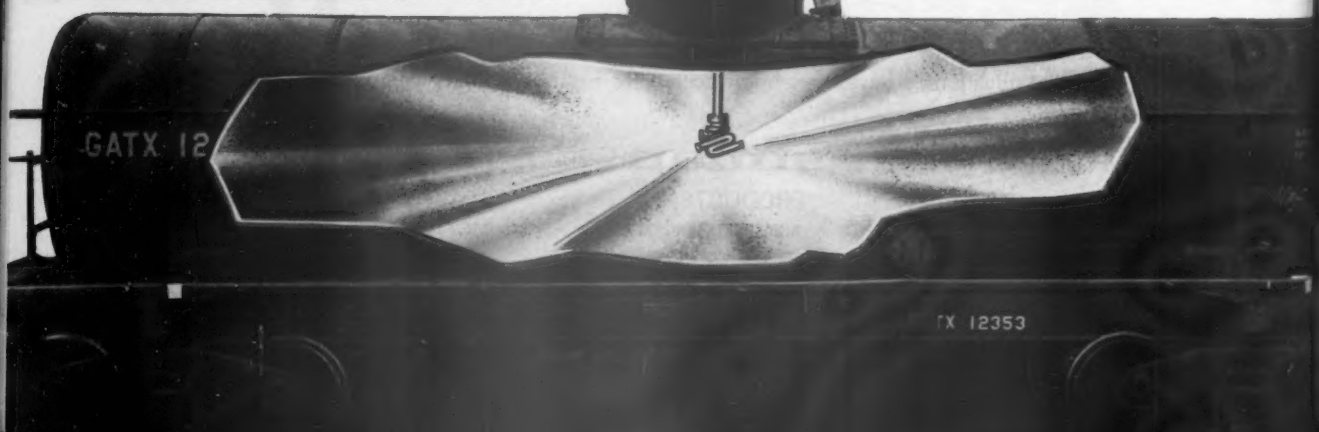
Not a chance! Helping to keep the "tanks" that rush ADM products to every corner of the country kitchen-clean is a tough job. The Company's 460 tankcars comprise the largest non-petroleum oil fleet in the world. To help in this gigantic task, ADM has high pressure car cleaning installations at 3 locations and modern facilities at other major plants.

Bert has been at the Minneapolis car cleaning installation since 1953. Ten years' experience in ADM operations previous to that taught him the importance of cleaning tanks and of getting them spotless . . . fast. In spite of the difficulties, Bert and his co-workers like to make the steel innards of a tankcar as pretty as black iron can get. There's a real satisfaction the way they do it . . .

ADM RESI NEWS

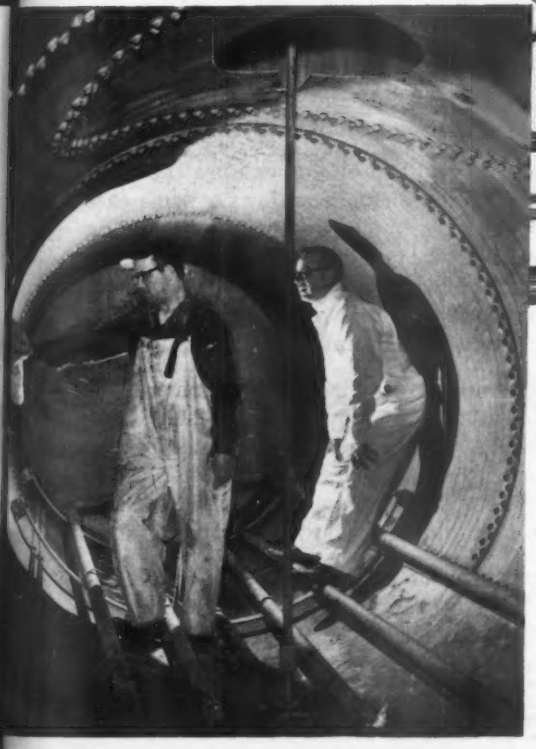
3 "It's a slick operation. We lower this cleaning boom into the tank and secure it at the dome with an air-tight cap. Strong, hot detergent solution under 100 lbs. pressure shoots through the tubular frame to the rotating head. Here it whips out of two nozzles, causing the head to spin at 30 RPM.

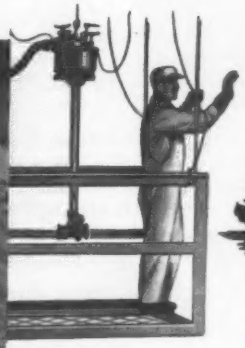
4 "While whirling vertically, the head also slowly revolves horizontally, blasting every surface of the tank with a powerful, hot cleansing stream. Next, the tank gets pressure-rinsed. The heavy-duty detergent cuts through every type of residue, dissolving deposits so that the rinsing is easy and thorough.

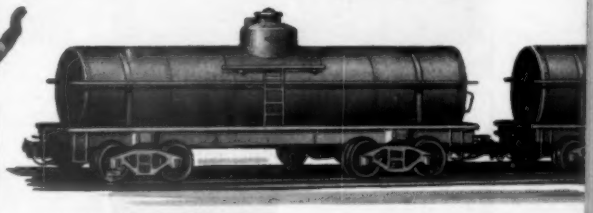


"This rig and a hard-working, heated detergent make the stickiest tank clean up fast. However, we take as much as 2½ hours on a really dirty one. Believe me, a tank that we've gone over before loading has nothing in it but pure, high quality resins.

2 "Still it's messy business . . . Some cars come in so caked up with dirt, sludge and dried, gummy oil skin that we have to crawl inside with scrapers to knick it loose. But we get them clean. Our own 'tanks' cause less trouble. That's true of any car cleaned regularly the way we do it.







Actually, ADM resin carriers cleaned by Bert Rucinski receive the same kind of cleaning as those hauling salad oils.

It's all part of ADM's team operation. The Company's research staff creates new and better products . . . the men in its many plants use ultra-modern equipment and processing methods to produce products to rigid specifications . . . established and maintained by control engineers at every major ADM installation. ADM technical representatives sell these products and provide customers top technical service.

Finally, the products are rushed to you in really clean tankcars and tank wagons. That's how Bert Rucinski, one of our 4,574 employees, does his part in making *ADM easy to buy from.*

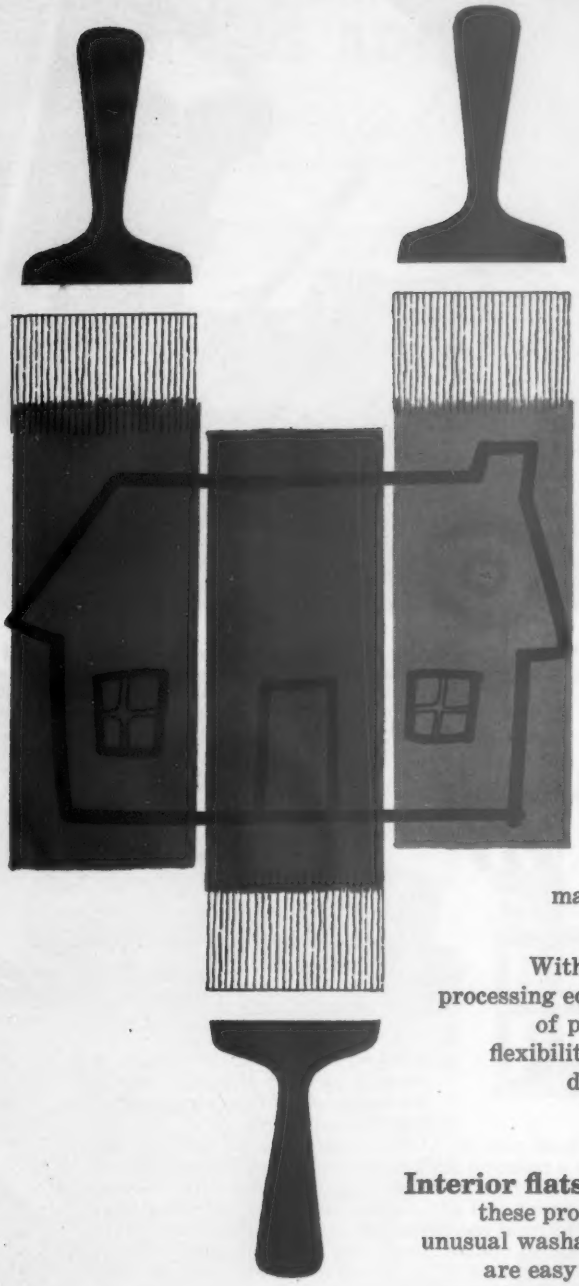
"The moist, warm air is sucked out of the tank to aid drying. Finally, the steam coils are checked and the interior is inspected. We climb down inside and with squeegees and fluffy cloths wipe up any residual water . . . . which could contaminate a tankful of product. Now the tank is clean."

Archer-Daniels-Midland

RESIN and PLASTICS DIVISION

700 INVESTORS BUILDING • MINNEAPOLIS 2, MINNESOTA

Let us show you comparative formulations!



NOW!
Superior exterior house paints at lower cost— using Isophthalic modified oil vehicle

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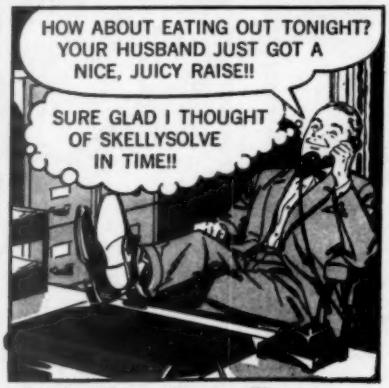

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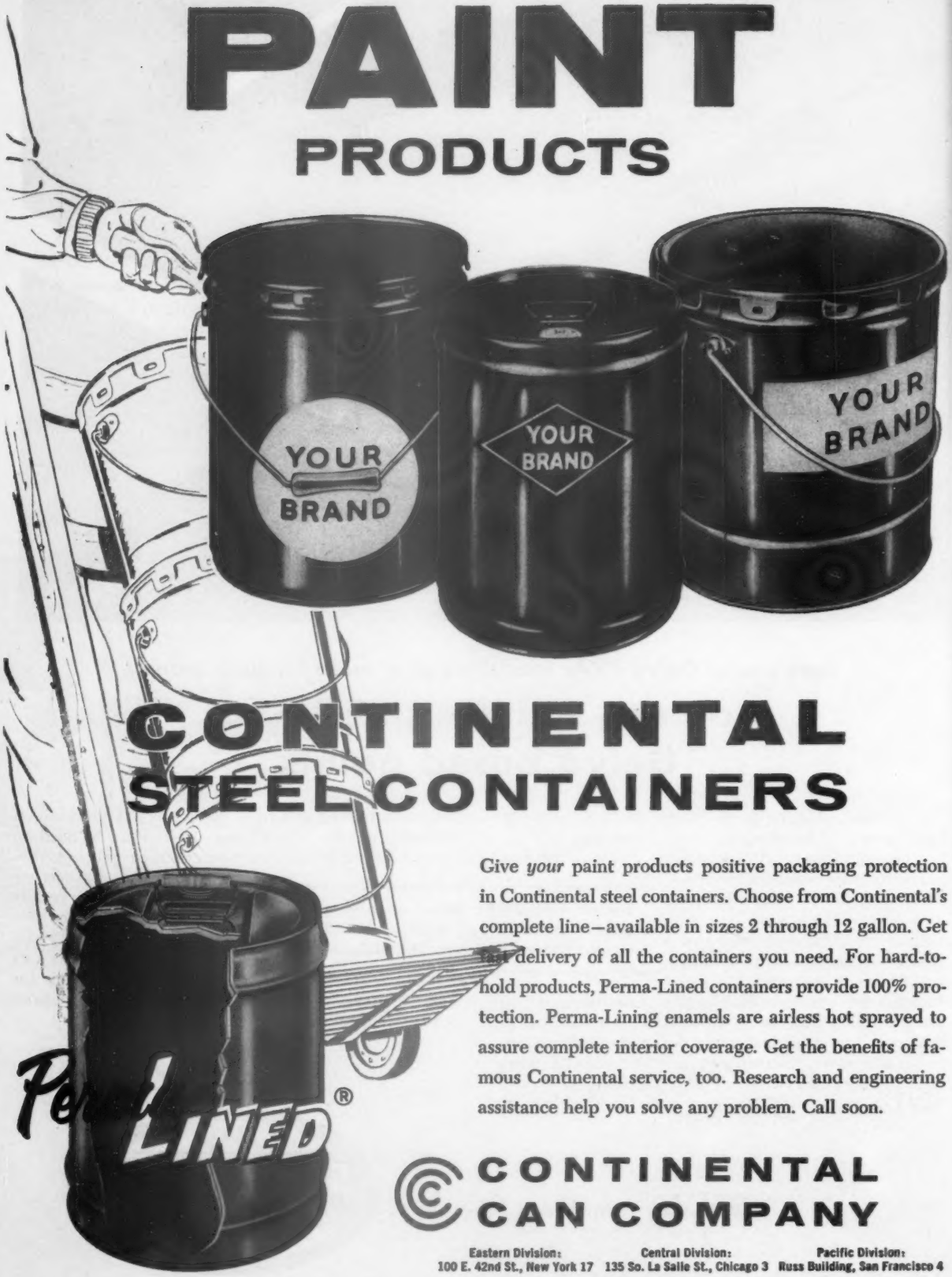

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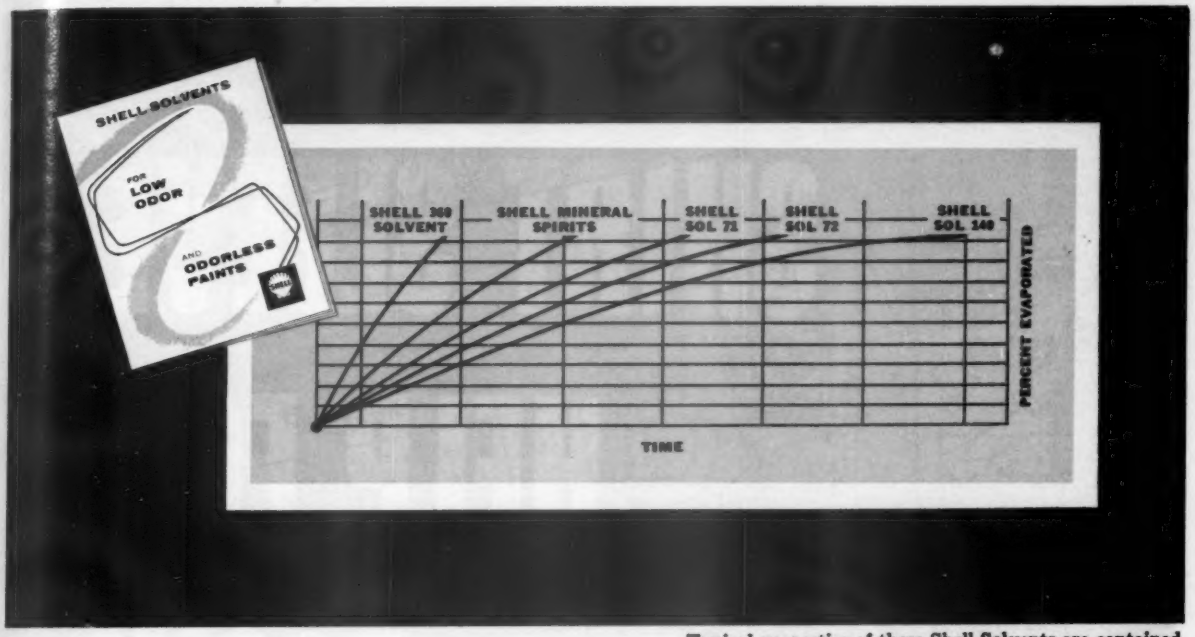

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TEST	SURFACE TENSION	Ph	% COAGULUM	VISCOSITY	FREEZE THAW	TOTAL SOLIDS CONTENT	MONOMER CHARGE RATIO	RESIDUAL STYRENE	SPECIFIC GRAVITY	MECHANICAL STABILITY	PARTICLE SIZE	
O. K.	✓	✓✓ ✓✓	✓	✓	✓	✓✓	✓	✓	✓	✓✓	✓	✓
FAIL												
INITIAL	JK	em emk ma SV	SK	ME	BV	HP AP	DZ	DH	SP	JR MB	CRK	CHA
DATE	10/15	10/15 10/15 10/16 10/15	10/16	10/15	10/15	10/15 10/15	10/15	10/15	10/15	10/15 10/15	10/15	10/15

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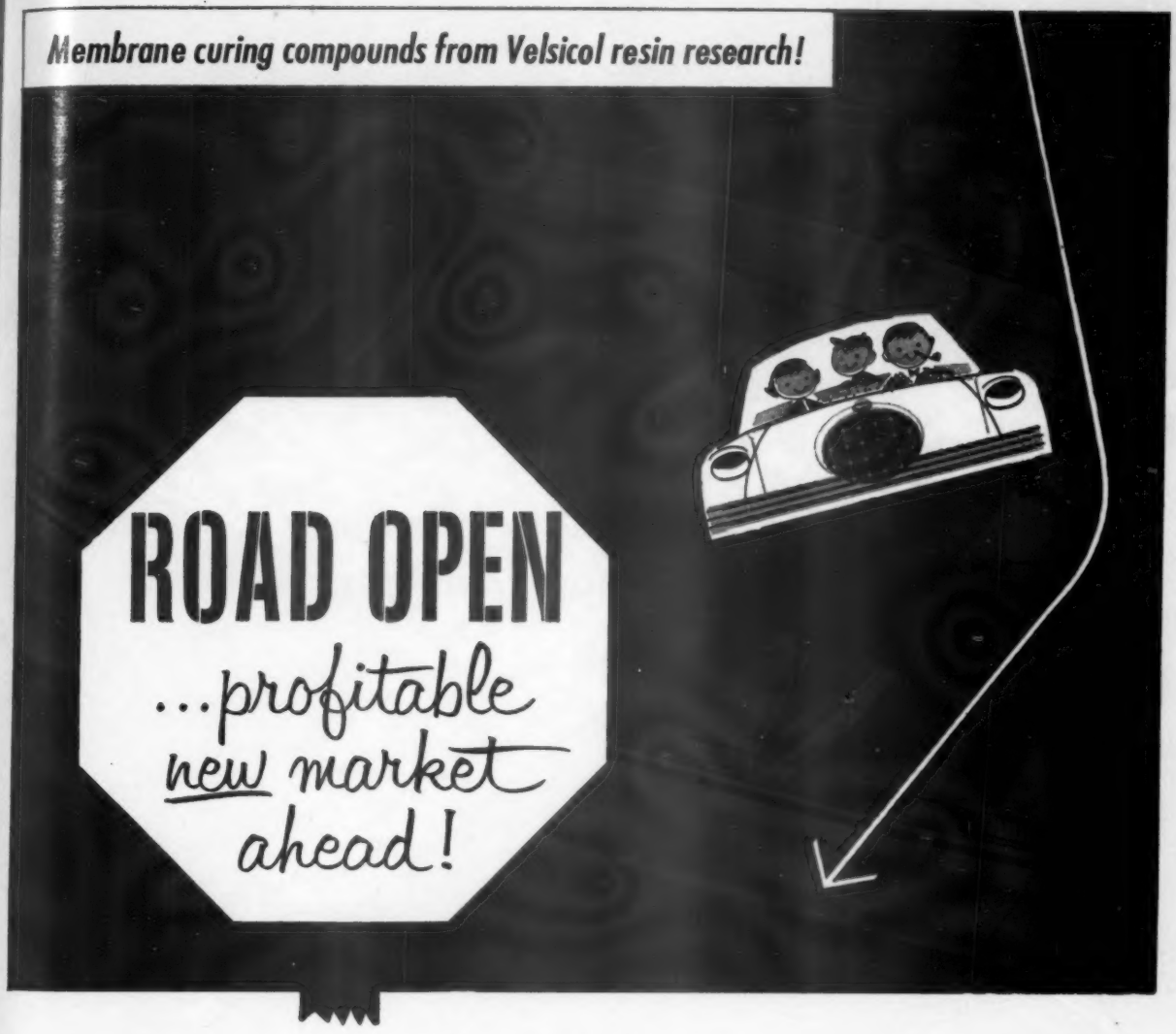

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WATER SORPTION OF MICA IN LATEX PAINTS

By
Dr. Max Kronstein
College of Engineering
New York University

IN the February issue of *Paint and Varnish Production* Stanley Le Sota presented some very interesting facts about the physical and rheological properties of low opacity pigments in water. He also presented a method for determining the constant of "water sorption"—the amount of milliliter of water necessary to invert an arbitrary volume of pigment. He selected a volume equivalent to 300 grams of diatomaceous earth, and he compared this factor of water sorption of a pigment to that of oil absorption. He observed that there was a certain relationship between (as far as he was able to calculate) the water sorption from an equation utilizing the oil absorption and an additional factor based on the specific area to the mass of a particular system. The results of such a calculation agree very well with his experimental values. In such a classification lamellar mica was at the top of the water sorption scale.

The question might arise, therefore, what influence, if any, this phenomenon may have on the development of a paint film from water dispersions of mica in latex paints.

Le Sota further pointed out that the water sorption value is something different from the amount of water demanded per 100 gallons of paint adjusted to a viscosity of 450 centipoises. He also showed that this demand might differ for the same pigment in two different latices. The work reported here confirms this observation and gives a few examples of the variation in the water-viscosity relationship for three different pigment-latex systems having varying mica content. It also shows that these varying water requirements do not interfere with the film formation of different paints, when each is used with the water content corresponding to its water demand. Moreover latex paints containing an extender of high water sorption can have greater sealing properties against water vapor penetration than paints containing an extender of low water sorption value.

Styrene-Butadiene Latex Paint

Some data of this section have been used in an earlier report of this research group, but requires a more critical review under the aspects of this present study.

The basic paint formulation used for this study, and its variations, are given in Tables I and II. Table II confirms Le Sota's recent observation that there exists a relationship between the water sorption of the pigments in a paint system and the water demand of the resulting paints. It is noted further that, in this particular paint system, the increase in water demand—measured as the viscosity at constant water content—does not take place until the mica content has reached approximately 50% of the total pigmentation. Beyond that the resulting viscosity increased rapidly with increasing mica content. By raising the mica content from 55% to 73% the resulting viscosity was more than doubled. And by raising it from 55% to 84% the resulting viscosity was increased nearly fourfold.

After these viscosity measurements all paints were diluted to the same viscosity level of approximately 300 centipoises, as shown in Table II. This resulted in paints

	Materials	Parts
1	Titanium dioxide rutile	251.0
2	Lithopone	71.0
3	Mica, 325 mesh	35.7
4	Lecithin, water dispersible	3.8
5	Distilled water	190.0
6	Casien solution	78.5
7	Foam controlling agent	3.5
8	Fungicide	37.0
9	Latex	447.2

(Materials 1,2,3,4, and 5 were mixed. Some of the latex of 9 and some of the water of 5 were added until enough fluidity was obtained to allow double grinding on the roller mill. Then the other materials were added under continuous electric mixing, and the mixing was continued for 30 minutes.)

Test Group I
Table I. Basic paint formulation based on styrene-butadiene latex.

Paint #	Hiding Pigment	Pigmentation % Mica	Viscosity cps	Diluted To cps
a		10	512	281
b	90%: 3.5 TiO_2	from dif-	439	320
c	1.0 Lithopone	ferent	618	301
d		sources	487	313
e	80%: 3.5 TiO_2 0.5 Lithopone	20	488	302
f	70% TiO_2	30	580	302
g	56% TiO_2	44	553	309
h	50% TiO_2	50	500	301
i	45% TiO_2	55	772	286
k	27% TiO_2	73	1709	298
l	16% TiO_2	84	2993	309
m	———	100	8507	324
n	100% TiO_2	———	1320	205

Test Group I
Table II. Variations in pigmentation of formulation in Table I.

of the same viscosity level but with widely different water content. And the question arose how such a wide variation in the fluid state of the latex paints would affect the formation of the dry films and their characteristics. While it was not possible to make precise thickness measurements of the dry films on wood panels and cinder-blocks used in this study, it can well be assumed that there were variations in the dry film thickness of these paints due to the difference in non-volatile matter. Any variations in the test results on the dry paints appear, however to be rather results of the decreasing hiding power due to the increase in low opacity pigment rather than the results of increased water content.

The paints described in Table II were applied on white pine panels, applying each paint in two coats (by brush). After 3 days of aging the panels were exposed to twin arc ultraviolet light in an effort to determine whether or not in a 200 hour exposure the paints will crack at different times and to a different degree. One of the panels (#e) showed slight cracking and this can not be correlated in this present study because all other panels with more or with less water did not crack at all.

In a second approach the appearance, or the "whiteness", was compared by measuring the reflectance with the use of the tri-green filter. As standard for 100% reflectance a paint was used having the same formulation with 100% titanium dioxide pigmentation. Here paints #a to #f (Table II) remained at an average reflectance level of 96%. Paints #g to #i (with up to 55% mica) had an average reflectance of 91%. The paint with 73% mica, which had been water diluted from 1709 cps. to 298 cps., showed a lower reflectance of 77% and the paint without any hiding pigment, that is with 100% mica and diluted from 8507 cps. to 324 cps., had for the dry film a reflectance of 66.2%. The rate of drop in reflectance compared with the rate of increase of water addition indicates that such decrease in reflectance of the dry film was predominantly the result of the decreased hiding power of the paint rather than of the higher water demand of the pigment or of the higher water content in the fluid phase.

Polyvinyl Acetate Latex Paint

In a second group polyvinyl acetate latex paint was studied varying again the hiding and the low opacity pigments. Table III shows the formulations and again confirms that a considerable increase in 325-mesh mica produced an increased water demand. And again it is observed that after the drying of the paint film the formation of the film had progressed satisfactorily independent of the initial water demand in the fluid phase. Certain differences in the resulting film thickness were again to be expected on the test cinderblocks. In each case, two coats of paint were applied by brush with one week's interval between the applications. The segments of the blocks were exposed by suspending them by wires from the top of the drum of the Atlas Weather-Ometer. After 200 hours exposure no variations was observed which might be caused by the differences in the water demand of the components of the pigmentation of the test paints (Table IV).

To trace closer for possible differences in the film density due to the higher water demand in the dispersion, the three paints were applied on one side of glass panels, preparing two glass panels each. And the paints were allowed to age for 1 week. Small boxes were prepared, 3 inches long, 2 inches wide and 1.5 inches deep. One-half of the number of boxes were built of aluminum foil, the other half of the black, dull paper of the "Morest" Test Charts. Thus half the boxes were made of a highly reflecting material, the other half of a very low reflecting material. By setting the test panels over the open top of these boxes for exposure to ultraviolet radiation, the panels over the reflecting aluminum boxes would

Composition of the Three Test Paints:	Paint A	Paint B	Paint C
MIXER CHARGE (with agitation)	g	g	g
Water	80	80	80
Dispersing Agent: Soybean lecithin (water dispersed 1:1)	6	6	6
Rutile Titanium Dioxide (RANC)	225	250	275
Extender I: Mica, (325 mesh)	25	50	75
Extender II: Talc (300 mesh)	100	50	—
Thickener: Methocel, 4000 cps., 2% solution	150	150	150
Defoamer: (Nopco 1707 A)	1	1	1
Fungicides (Dowicide G, 10% solution)	16.5	16.5	16.5
One Pass on the Three Roller Mill			
LET DOWN:			
Methocel 4000 cps., 2% solution	50	50	50
Polyvinyl acetate latex, internally plasticized, copolymer, 55% N.V.	345	345	345
Water	75	85	125
Fusing agent: Hexylene Glycol	14	14	14
Stabilizer: Ethylene Glycol	30	30	30
TOTAL YIELD	1117.5 g	1127.5 g	1167.5 g

Test Group II

Table III. Polyvinyl acetate latex vehicle, 55% N.V.

be exposed to the illuminating energy as well as to the reflected energy. The panels tested on the black boxes would receive very little reflected energy. And the difference in results was expected to give an indication for the variations in the density of the films for the various test paints. As ultraviolet light source the Hanovia Utility Quartz Lamp was used at a distance of 5 inches from the paint surfaces. The panels were exposed for 1 week.

Table V shows the changes in the tri-green filter reflectance values of the panels. While paint #C contained 66% more water than paint #A, due to the tripling of the mica content, the test results remained of the same order. This appears to give an indication that even this considerable difference in water content in the fluid phase did not result in any corresponding decrease in the uniformity of the developed dry film.

Latex Alkyd Paint

These paints were included in this study in view of their very interesting film density which the author discussed at an earlier occasion. Here again it is found that with the introduction of considerable amounts of mica, there is an increase in the water demand of the paint. Tables VI and VII show that this is not the case, when only 10% mica is added, but it is the case with higher mica additions. The amount of water demanded in Table VII is the water added to obtain a similar degree of brushability.

Four of the test paints were then exposed under the Hanovia Quartz Lamp (Type SH) for 240 hours and their change in reflectance and in gloss were compared in Table VIII. Again the variations appear to be rather a result of the variations in hiding power, due to the progressing decrease in hiding pigment, rather than the result of the increased water demand. Similar results were obtained under Weather-Ometer exposure.

Paint No.	Reflectance (Whiteness) (Tri Green Filter) Before	After Exposure	Gloss Against Carrara Glass Standard Before	After Exposure
A	84.8	74.5	2.5	3.1
B	84.0	72.5	2.5	2.5
C	84.0	75.0	2.5	3.0

Test Group II

Table IV. Reflectance and gloss of two coats of paint on cinder block, before and after 200 hours in a Weather-Ometer.

Particle Shape and Film Uniformity

The introduction of the factor of "water sorption" and Winchell's classification of pigments (according to the correlation of a specific area to the mass of a pigment group) has placed the lamellar mica in the class of having the highest oil absorption and water sorption (Le Sota states).

Paint No.	Background	Tri Green Reflectance Before Exposure	After	Gloss (Against Carrara Glass) Before Exposure	After
A	BLACK	89.3	85.8	4.2	2.3
A	ALUMINUM	90.0	84.8	4.5	2.3
B	BLACK	90.0	85.8	3.1	2.5
B	ALUMINUM	90.0	85.1	3.0	2.5
C	BLACK	88.0	84.9	4.2	2.5
C	ALUMINUM	89.3	83.9	4.1	2.6

Change In Reflectance Over Aluminum MInus Change In Reflectance Over Black:

Paint No.	Change Over Aluminum	Change Over Black	Difference (In Units)
A	90.0 - 84.8	89.3 - 85.8	1.7
B	90.0 - 85.1	90.0 - 85.8	0.7
C	89.0 - 83.9	88.0 - 84.9	2.0

Test Group II

Table V. One week exposure under ultraviolet light (panels set against aluminum and against black backgrounds).

Titanium Dioxide, rutile	246.9 parts
Lithopone	70.5
Mica, 325 mesh, wet ground	35.3
Starch Solution (7.5%)	278.3
Sodium Hydroxide Solution (10%)	18.6
Wetting Agent	10.4
Alkyd Resin (100% solids)	104.0
Cobalt Naphthenate (6% Co)	3.3
Lead Naphthenate (24% Pb)	8.4
Anti-Skinning Agent	0.6
Styrene-Butadiene Latex (48% solids)	222.4
Anti-Foaming Agent	1.0

Test Group III

Left: Table VI. Basic formulation of paint based on Latex alkyd vehicle.

Below: Table VII. Base formulation with varying hiding pigment.

Designation Of Paint	Composition (parts) Titanium Dioxide	Lithopone	Parts Mica	Percent Mica	Water Added To Base Formulation To Obtain Brushability
0% Mica	313.6	70.5	0	0	0
#1	246.9	70.5	35.3	10	0
#2	246.9	0	105.8	30	100 cc. approx.
#3	176.35	0	176.35	50	200 cc. approx.
#4	105.8	0	246.9	70	350 cc. approx.
100% Mica	0	0	352.7	100	500-600 cc. approx.

It has placed the columnar or tabular barytes in the class with the lowest oil absorption and the lowest water sorption. The question therefore arose what difference was there in films produced of latex paints containing pigments of different shape. As a criterion, a test was selected to determine how much the film of each of the test paints might act as a sealer against the evaporation of water vapors through the latex paint film. Styrene-butadiene latex paint films were selected. Their composition is given in Table IX. The paints contained the same amount of rutile titanium dioxide. Paint I contained, in addition, a mixture of zinc oxide and barytes, as recommended in a formulation of the latex producer. The other two test paints contained the titanium dioxide with 325-mesh mica as additional pigment. The difference between the two mica containing paints was that the vehicle of #II was the same as in paint #I. In Paint III the surface active agent only was replaced by soybean lecithin, which is a more effective pigment dispersion agent for mica. This table shows that in this series the paint with the zinc oxide and barytes pigmentation has a greater water demand than the mica containing paint. It is assumed that this is due to the use of the zinc oxide rather than due to the barytes.

First a study was made to determine how far the pigment-vehicle systems of the three paints differ in their flow-out conditions and how far they maintain such conditions on standing. This was measured by a flow-out pour test which this research group developed some time ago (Table X) and which consists of the following procedure: A number of 8 inch Pyrex tubes are filled with each of the test paints and at certain time intervals of storage one test tube of each paint is clamped in a holder and turned to an angle of 45° with its open end fixed above the opening of an identical empty tube, which is clamped in a vertical position. The amount of paint which does not flow out in 1 minute, 2 minutes and 5 minutes in the 45° position is determined by weighing and is calculated in percent based on total paint. The tests are made at the temperature of the storage room and give an expression for the flow-out characteristics and for the free pigment dispersion in the paint. Table X shows that the three paints in this study showed slight differences after 2 weeks of storage, which increased considerably after 4 weeks of storage. At both test periods the pigment vehicle dispersion II and III flowed out more uniformly than No. I, with No. III maintaining the freest flow-out throughout the test period. These results indicate that the high water sorption factor and the high water demand of the mica did not produce an increased re-separation. In these systems it was rather the opposite compared with the titanium dioxide and barytes system.

In order to test how films produced from one test paint differed with others in water permeability, each of the three paints was applied to a glass plate, using a 6 mil wet film Bird Applicator (Table XI). After being allowed to dry, the films were removed from the glass by immersing the panels into a water solution of tribasic tertiary sodium phosphate. The films were lifted off, washed in

Paint No.	Percent Mica	Reflectance (Tri-Green Filter) 0 Hrs.	Reflectance (Tri-Green Filter) 240 Hrs.	Gloss (Carrara Glass Standard) 0 Hrs.	Gloss (Carrara Glass Standard) 240 Hrs.
#1	10%	83.0	75.3	8.0	5.5
#2	30%	73.0	73.0	13.0	4.5
#3	50%	81.0	70.1	4.0	4.1
#4	70%	82.0	67.0	8.0	4.8

Test Group III

Table VIII. Behavior of four test paints in 240 hours exposure to quartz lamp.

		Paint I	Paint II	Paint III
MILLING CHARGE		g	g	g
Water		147	147	147
Surface Active Agent: Tamol 731 (25%)		7.5	7.5	—
Defoamer: Surfynol 102 (20% in ethyl alcohol)		5	5	5
Titanium Dioxide (Rutile: RA-NC)		149.5	149.5	149.5
Barytes		130.5	—	—
Zinc Oxide (XX 601)		93	—	—
Thickener (Ben-A-Gel)		0.8	0.8	0.8
Mica, 325 mesh, wet ground		—	223	223
LET DOWN				
Lecithin, water dispersible		—	—	7.5
Styrene-Butadiene Latex (46% solids)		541	541	541
Surface Active Agent: Triton X-100 (25% N.V.)		10	10	10
Thickener: Methocel, 50 cps., 5% N.V.		20	20	20
Catalyst: Magnesium Acetate, 10% N.V.		20	20	20
Citric acid (10% N.V.)		6	6	6
VISCOSITY	cps.	200	48	53
Water added		30 g	—	—
Viscosity of samples for tests		50	48	53

Test Group IV
Table IX. Paint formulation based on styrene-butadiene latex vehicle.

fresh water and dried on absorbent paper. Then they were attached over the tops of Pyrex beakers, which were partially filled with water and then were exposed to a temperature of 75-80°F. The rate of water vapor evaporation was studied by weighing the beakers at certain time intervals. The resulting calculated values are shown in Table XI.

At the end of the test, paint #I (with zinc oxide and barytes) had lost 29.5% more water than the paint #II (with 325-mesh mica) and also had lost 80% more water than the paint #II, where the pigment also had further been dispersed by the use of water dispersible soybean lecithin.

These data indicate that in spite of the larger water sorption number for mica, mica latex paints showed a higher degree of water vapor sealing properties, which is due to their pigment shape and influenced by their dispersion.

It can be summarized that an increase in water sorption of a pigment can increase the amount of water demand in a paint containing such pigments; i.e., it can increase the amount of water which is required to obtain paints of comparative application conditions. But this increase in water did interfere with the film forming properties of the paint. Thus, these characteristics are more influenced by the particle shape of the low opacity pigment than by their water sorption factor.

Paint No.	After Time Of Storage 2 weeks	4 weeks	Flow Out Time min.
I	9.60%	95.40%	after 1 minute
	7.68	84.30	after 2 minutes
	5.65	82.90	after 5 minutes
II	5.02%	16.82%	after 1 minute
	3.68	9.60	after 2 minutes
	2.68	7.32	after 5 minutes
III	3.08%	5.79%	after 1 minute
	2.01	5.10	after 2 minutes
	1.54	3.48	after 5 minutes

Test Group IV
Table X. Pour test—Percent solids remaining after flow out at 45° angle.

Acknowledgement

The author wishes to express his appreciation for the cooperation which he received from the Wet Ground Mica Association, and he thanks his coworkers Herman Abramski, Victor Cordones and Julio Rivera for the laboratory developments of this investigation.

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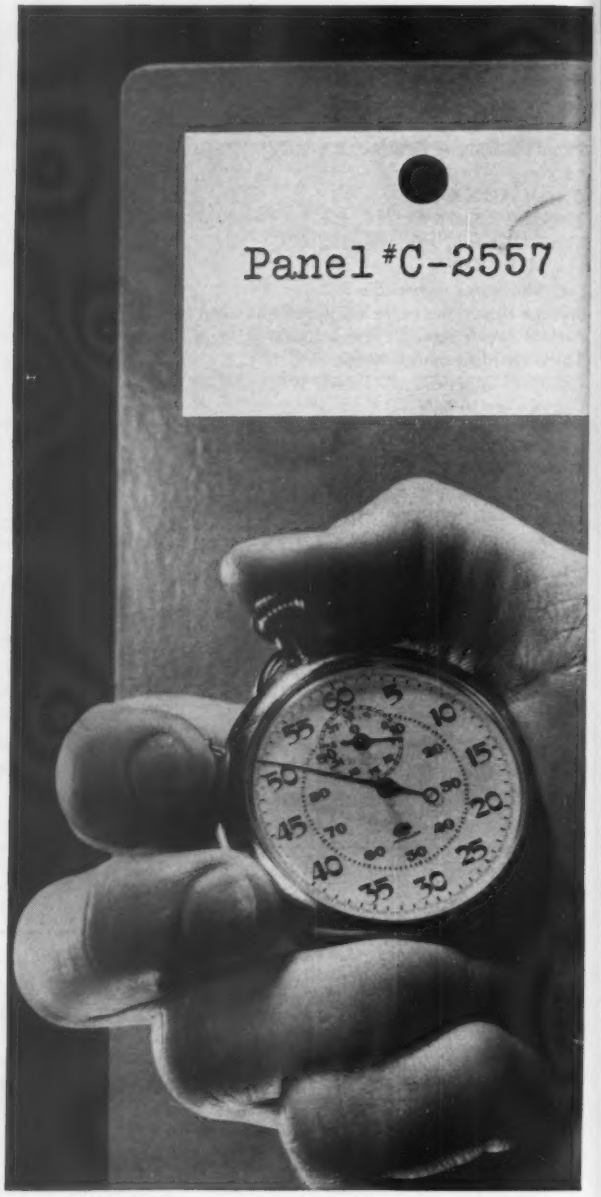
Test	Paint I g	Paint I Total Loss %	Paint II g	Paint II Total Loss %	Paint III g	Paint III Total Loss %
Initial Water Weight	9.9899	—	10.0301	—	9.9764	—
Loss After 7 Days	0.4195 g	—	0.3713 g	—	0.3783 g	—
in %	4.20%	4.20%	3.70%	3.70%	3.79%	3.79%
New Loss After 11 Days	0.2800 g	—	0.2581 g	—	0.2278 g	—
in %	2.93%	7.00%	2.57%	6.26%	2.28%	6.08%
New Loss After 35 Days	1.3877 g	—	1.1526 g	—	0.7243 g	—
in %	14.9%	21.00%	12.2%	17.30%	7.74%	13.35%
New Loss After 49 Days	0.9810 g	—	0.6057 g	—	0.3607 g	—
in %	12.4%	30.70%	7.35%	23.70%	4.18%	17.05%

Test Group IV
Table IX. Moisture holding tests.



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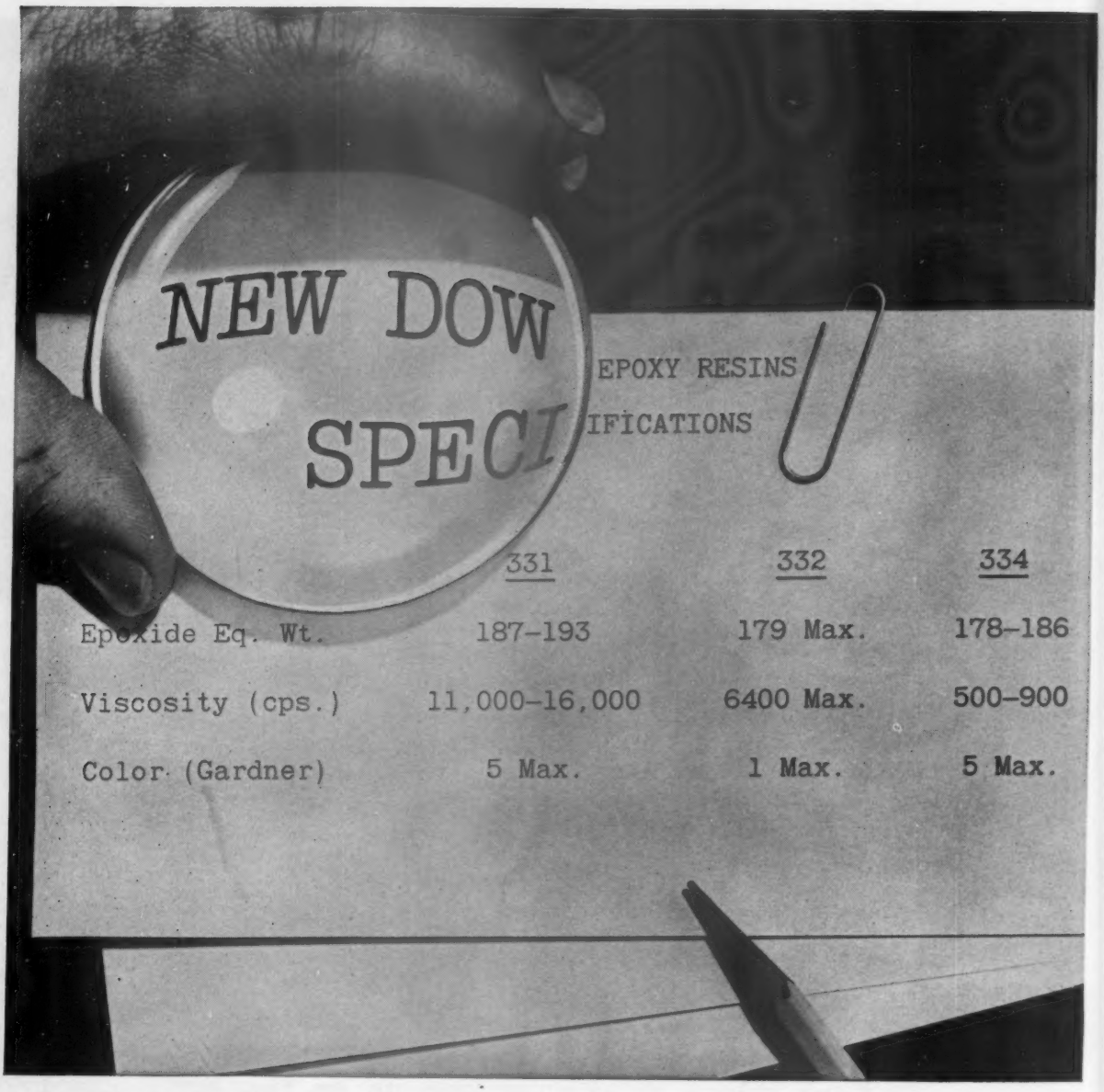

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YOU CAN DEPEND ON EPOXY DOW

A Staff Report

PETROCHEMICALS for PAINT

PART V

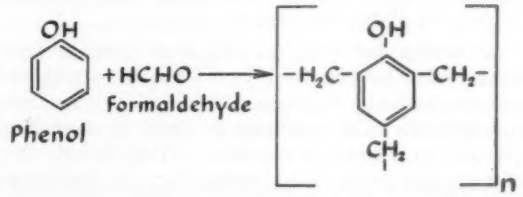
Petrochemistry and the Paint Chemist

(continued)

Phenolic Resins

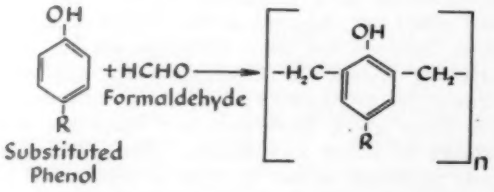
Phenolic resins result when phenol or substituted phenols are condensed with formaldehyde. The basic ingredients, then, are or may be of petrochemical origin. In the protective coatings field, the phenolic resins find their largest use in oleoresinous varnishes. Considerably smaller amounts are used in phenolic modified alkyd resins and in nitrocellulose lacquer formulations.

If phenol itself is used, three positions are available for condensation with formaldehyde, and a cross-linked polymer can result. The equation which demonstrates this is indicated below:



Obviously, such resins will gel if the polymerization is allowed to proceed far enough. Normally, it is carried out with catalysts and reagent ratios such that an ungelled intermediate results. Further heating may effect complete gellation, once the phenolic is in the form of a film.

If the para position of the phenol is occupied, the condensation can take place only in the two positions ortho to the hydroxyl. This means only linear polymers can result as indicated in the following equation:



The R group is frequently another phenyl radical or a tertiary butyl group. Such resins are oil-soluble and are referred to as 100 per cent phenolics. Para tertiary amylphenol and para cyclohexylphenol are also used for the preparation of the so-called 100 per cent phenolics.

Since a straight phenolic resin is not oil-soluble, certain modifications are necessary in order to achieve the desirable property of oil-solubility which makes it possible to use the material as a varnish resin. Thus, resins based on phenol, the cresols (monomethyl phenols) and the xylenols (dimethyl phenols) are normally not oil-soluble. Resins based on phenols in which there are large substituting groups in the para position, on the other hand, do exhibit oil-solubility and thus do not require modification.

The most common modifier for phenolic resins is rosin. The polyhydric alcohol esters of rosin and certain natural resins, such as Congo resins, are also used as modifiers. It is these modified phenolic resins, when combined with tung oil, which provided the varnishes for the first "four hour enamels." It

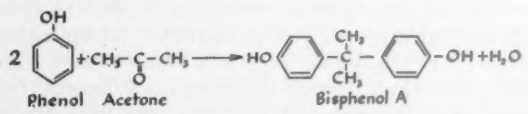
is interesting that the so-called modifier is usually the component used in largest percentage. Thus, most modified phenolics contain seven to twelve per cent of phenol formaldehyde condensate and the remainder of the product is rosin as such or esterified with glycerol or pentaerythritol.

Reference has already been made to the oil-soluble type phenolic resins which result when para substituted phenols, containing large substituent groups, are condensed with formaldehyde. When higher ratios of formaldehyde are used, methylol groups are present which confer reactivity to the resin. Alkaline catalysts tend to favor the preservation of the methylol groups. Acid catalysts cause the reaction to proceed so rapidly that cross-linking and insolubility result, unless the ratio of formaldehyde to phenol is sufficiently low to prevent insolubility. The reactive and non-reactive types of oil-soluble resins are both used in varnish formation.

Still another type of phenolic is the so-called baking phenolic. These are prepared with alkaline catalysts and the ratio of formaldehyde to phenol is such that gellation may eventually result. However, during manufacture the reaction is stopped at a stage where the resin is still soluble; thus it may be applied from solution to various surfaces and thereafter baked to effect the cross-linking reaction. These baked films have excellent solvent and corrosion resistance and excellent resistance to acids. Their alkali resistance, however, is poor, and general flexibility is low.

Still another form of the phenolic resins are the so-called phenolic dispersion resins. These are prepared by heating phenolic resins and drying oils together in the presence of a dispersing agent. The oils are thus gelled but, because of the dispersing agent, the entire composition may be dispersed in aromatic solvents. When the dispersions are applied to a surface, the coatings dry by solvent evaporation to give films which have excellent durability and resistance to water and alkalis. The greatest use of these materials is not as film formers alone but in combination with alkyd resins and varnishes to shorten drying time and to improve water and chemical resistance.

One of the very important uses of phenol today is for the preparation of bisphenol A which results from the condensation of acetone and phenol according to the following equation:

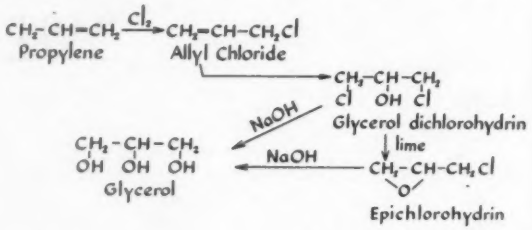


Bisphenol A may be used for resin preparation in the same way that the phenols or the substituted phenols are used. The largest use of bisphenol A, however, is for the manufacture of the epoxy resins.

Epoxy Resins

When one discusses exciting recent contributions of the petrochemicals industry to the surface coatings field, he must mention, practically in the same breath, the latex paints and the epoxy resins. The epoxy resins which have enjoyed excellent acceptance and rapid growth are, as has already been indicated, condensation polymers which form when bisphenol A condenses with epichlorohydrin. Bisphenol A, which has been discussed under phenolic resins, is based on two important petrochemicals, phenol and acetone. The condensation of these takes place at the relatively low temperatures of 15 to 60°C. and requires strong acids such as sulfuric or hydrochloric for catalysts. Although theory requires only two mols of phenol per mol of acetone, about 3.5 mols of phenol are actually used. In commercial operation yields as high as 90 per cent, based on the acetone, are obtained after two hours of reaction. After the reaction is complete, the excess phenol must be recovered, the acid catalyst must be removed by washing, and the product must be purified by vacuum distillation.

Epichlorohydrin, on the other hand, is derived from propylene by a route which includes, also, allyl chloride, glycerol dichlorohydrin and glycerol. The relationships are indicated in the following equations:



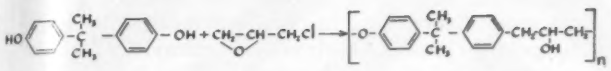
As the above equations indicate, allyl chloride is obtained in the conventional glycerol synthesis by the chlorination of propylene. This is a high-temperature chlorination requiring specialized corrosion-resistant equipment. When the product of this reaction is treated with hypochlorous acid (chlorine and water), glycerol dichlorohydrin results. Obviously, the hydrolysis with strong alkali of the two chlorine atoms in glycerol dichlorohydrin leads to glycerol. If, however, a much milder alkali such as aqueous lime is used, HC1 is split out and epichlorohydrin results. The epichlorohydrin, of course, may be used as such for epoxy resin synthesis or it may be hydrolyzed further with aqueous caustic to glycerol. Actually, whether the epichlorohydrin is isolated or not, it is undoubtedly an intermediate in the direct hydrolysis of glycerol dichlorohydrin to glycerol.

At this point it is important to indicate that an entirely new process for glycerol synthesis is becoming commercial. In this process propylene is converted to acrolein. The acrolein, in turn, is converted to glycerol in a series of reactions which include the use of hydrogen peroxide to hydroxylate the double bond.

The new synthesis of glycerol is significant from several points of view. First of all, it does not require allyl chloride, which, accordingly, is freely available for the synthesis of epichlorohydrin, as indicated above. Secondly, the hydrogen peroxide oxidation to glycerol is certainly an outstanding contribution to chemical technology.

To return, however, to the epoxy resins, the condensation reaction which leads to resin formation is carried out in the presence of alkali as the following

equation indicates:



The epoxy resins vary in physical form from hard, relatively high melting solids to fluid syrups. The difference in physical form is a function of the degree of polymerization which, in turn, is affected by the ratio of the reagents. By and large, the protective coatings industry prefers the hard epoxy resins and particularly those of intermediate molecular weight.

Total current epoxy resin production is probably of the order of about 45 million pounds per year. Without question, the bulk of this material is consumed by the protective coatings industry. Current estimates place epoxy resins consumption for paints in the order of 30 million pounds per year. The remainder of the production is utilized by the tool and die industry, the adhesives industry, for electronic potting and encapsulating, for structural laminates and for certain specialty uses such as plastic solders.

Epoxy resins have two functional groups, hydroxyl groups and epoxy groups, and both of these are utilized in protective coatings manufacture. The hydroxyl groups may be esterified with acids such as soy, linseed, tall oil and dehydrated castor oil acids. Vehicles result which resemble alkyds in many respects. They are superior to the alkyds, however, from the point of view of solvent resistance but inferior so far as color stability and weathering is concerned.

Although the bulk of the epoxy resin coatings produced today are esters of this type, more unconventional types of coatings which take advantage of the epoxy group are making headway because of the advantages they present. The epoxy groups react rapidly with amine groups either in simple amines like diethylene triamine or in more complicated resinous structures like certain polyamide resins. The coatings which result are highly cross-linked structures with excellent adhesion, solvent and chemical resistance and a high degree of flexibility.

Still more highly specialized coatings with unique properties result when the fluid epoxy resins are used. Thus, the fluid resins, combined with amines or fluid polyamide resins provide solventless coatings. Mixtures with coal tar are gaining importance as maintenance coatings, and fluid epoxies "pigmented" with sand and subsequently combined with the proper curing agent provide a concrete-like material which is said to have many advantages over the standard types of concrete.

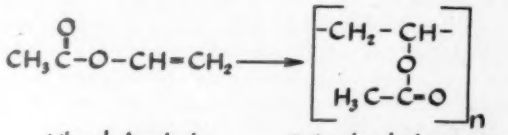
All of these catalyzed coatings cure at room temperature although, as might be expected, higher temperatures facilitate the cure. It is interesting to note, however, that the hardness of the films tend to be the same regardless of whether curing takes place at room or at elevated temperatures.

Baking compositions based on the epoxy resins result when they are combined with urea or melamine-formaldehyde resins or with certain reactive phenolic resins. Such coatings are of particular interest for applicance enamels.

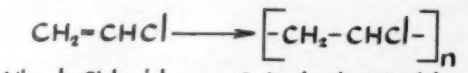
Vinyl Resins

Vinyl resins are produced by a type of polymerization which depends on the difunctionality of a double bond. Thus, the simplest unsaturated hydrocarbon, ethylene, can be polymerized to polyethylene, as a previous equation in this article has demonstrated, because the double bond is difunctional and makes possible the addition of similar reactive groups to both of the carbon atoms in ethylene. This type of polymerization, as a matter of fact, is called addition polymerization as opposed to the condensation polymerization which produces phenolic or epoxy resins. In this latter type of reaction, a small molecule, such as water or alcohol, is always eliminated.

Under the discussion of elastomer resins, a number of polymers were described which are really vinyl-type polymers. They were grouped under the elastomer heading, however, because of their relationship to the synthetic rubbers. Other types of vinyl polymers result when vinyl chloride, vinyl acetate, or a mixture of these are polymerized. The following equations demonstrate the polymerization of vinyl chloride and vinyl acetate:



Vinyl Acetate — Polyvinyl Acetate



Vinyl Chloride — Polyvinyl Chloride

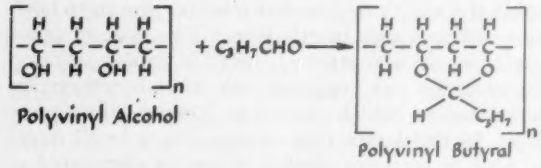
Again we are discussing chemicals which have strong petrochemical roots, as reference to the earlier discussion of vinyl chloride and vinyl acetate will indicate. Vinyl resins formulated into paints and applied from solvent solution to a surface are important as maintenance paints and as corrosion resistant finishes for metals. As water dispersions, the vinyl resins provide a latex for water-based paints and this application, particularly, is an expanding one.

The most important vinyl resins for conventional solvent-type paints are vinyl chloride-acetate copolymers. These are more soluble than the straight vinyl chloride resins and have better compatibility with plasticizers and with other film formers. Generally, these copolymers have high vinyl chloride content and because of this they are sensitive to degradation by light and heat and must be appropriately stabilized. The films provided by vinyl resins are tough and have excellent resistance to abrasion and chemicals. Because the films are thermoplastic, they are sensitive to solvents such as ketones.

Baking primers result when vinyl resins are plasticized with dioctyl phthalate and pigmented with basic blue lead sulfate. Lighter colored primers result when pigment combinations are used such as mixtures of basic white lead sulfate, rutile titanium dioxide and antimony oxide.

Vinyl resins, in general, do not demonstrate particularly good adhesion to metals, but rather depend

on film integrity for their protective properties. In order to improve adhesion, particularly for air-dry systems, wash primers have been devised. These are usually based on a vinyl butyral resin whose formation from polyvinyl alcohol is shown by the following equation:



Polyvinyl Alcohol — Polyvinyl Butyral

The starting material for polyvinyl butyral resin, polyvinyl alcohol, results from polyvinyl acetate by saponification of the acetate linkages. Reaction of polyvinyl alcohol with butyraldehyde provides the polyvinyl butyral resin. These are the same polymers, incidentally, which form the basis for the interlayers for safety glass. For a wash primer, polyvinyl butyral resin is combined with either basic zinc chromate, lead chromate, or chromic phosphate. The mixture is then combined with phosphoric acid and applied to the metal surface. Such wash primers can be used with topcoats based on phenolics, alkyds and oleoresinous vehicles. Vinyl topcoats, on the other hand, must be chosen with care since all of the vinyl resins do not adhere to the wash coat primer.

Still other types of vinyl primers are based on copolymers containing small quantities of carboxyl groups. Presumably, these are introduced by including maleic anhydride or other unsaturated acids in the initial polymer mix.

Because vinyls tend to give high viscosity at low solids concentrations, organosols have been formulated. These are dispersions of the vinyl resins in solvent. Because they are dispersions rather than true solutions, higher solids concentrations are possible. Organosols may be pigmented to provide paints particularly for metal decorating. Once applied, they must be baked at high temperatures in order to fuse the film so that ultimate toughness, inertness and chemical resistance results.

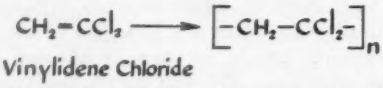
The vinyl resins may be combined with other film formers such as alkyds and silicones and also with nitrocellulose for lacquers.

Since vinyl acetate can be polymerized in emulsion, polyvinyl acetate emulsions are rather readily prepared. With the advent of latex paints, it was only reasonable to consider polyvinyl acetate emulsions as vehicles. Of particular interest is the good weatherability of polyvinyl acetate for outdoor paints.

Because some of the acetate groups tend to hydrolyze, polyvinyl acetate emulsions are acidic. Accordingly, they are compatible with other latices which are cationic or non-ionic. They are not, however, compatible with the anionic latices such as the butydiene-styrene dispersions.

Films from polyvinyl acetate emulsions are light and color stable and demonstrate good adhesion to most surfaces. Because they have reasonably good resistance to alkali, they are valuable for masonry paints. Also, the polyvinyl acetate emulsions form the basis for some of the exterior latex paints recommended for both wood and masonry surfaces.

A still different type of vinyl polymer results from the polymerization of vinylidene chloride which is unsymmetrical dichloroethylene. The polymerization may be demonstrated by the following equation:



Vinylidene Chloride

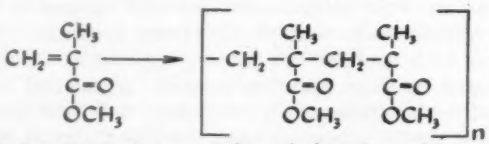
Since polyvinylidene chloride is a very hard insoluble resin, vinylidene chloride is usually copolymerized with materials like vinyl chloride. Since such polymers give a discontinuous film on drying, they must be blended with plasticizers or other film-forming materials in order to achieve continuity. These latices have also been recommended for latex paints.

Vinylidene chloride may be copolymerized with acrylonitrile to obtain a copolymer which also provides a suitable latex for the formulation of water-dispersed paints. Such latices are known as "Sarans", and require plasticizers for effective use. The films demonstrate low moisture or organic vapor transmission and appear to be excellent for metal protection.

Acrylic Resins

The acrylic resins are polymers and copolymers of the esters of acrylic and methacrylic acid. The petrochemical origins of these materials have already been discussed. Since acrylic resins result from double bond polymerization, they fall into the same category as the vinyl resins. The distinction is strictly one of nomenclature, the vinyl radical consisting of two carbon atoms and one double bond, whereas the acrylic radical contains three carbon atoms and one double bond. The acrylic resins are thermoplastic and are noted for their excellent color and color stability. Castings are glass-like in clarity. Also, the acrylic resins have good heat resistance and are resistant to acids, alkalis, water and alcohol. Because their acid numbers are low, they do not react with pigments.

The polymerization of methyl methacrylate to polymethyl methacrylate can be demonstrated by the following equation:



Methyl methacrylate — Polymethyl methacrylate

The acrylic resins are available both as latices and as hard resins which can be formulated into solvent solutions. In both forms they are of interest to the protective coatings industry. Acrylic latices are becoming more and more important for water-dispersed paints. Because the acrylic resins have rubber-like elasticity, they do not require plasticizers. Many of the emulsions are nonionic and thus demonstrate a wide range of compatibility with other latices and emulsions. Their stability, both mechanically and from the point of view of freeze-thaw resistance,

(*Turn to page 87*)

HIDING POWER.

By any standard means of measurement, Mapico pure synthetic iron-oxide pigments score *high* in hiding power. The Mapico Brown on this page has been determined to have a relative hiding power of 1000 sq. ft./lb. measured using the brush-out method with a 20% pigment concentration in a linseed oil vehicle.

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EPOXY-BASED MASONRY MATERIALS

By

Philip Maslow*

Part II-Epoxy Flooring Compounds

IN dealing with building and maintenance of a structure, we must bear in mind that there are essentially three important parts or members which will require painting or maintenance of some kind, both at the time of construction and subsequently through the years. These members are walls, ceilings and floors. The walls have two sides, one of which may be an exterior, with each requiring a different type of treatment. Ceilings are generally the least abused, although in many industrial installations corrosive fumes and liquids may cause considerable damage. The roof of a structure generally has one sole purpose—and that is to keep out the weather. Tars and pitches have always been used to waterproof a roof and we also have such materials as slate tile. Periodic caulking and tarring will usually keep a roof in repair since it seldom undergoes any abuse by wear.

Of all the members, floors undergo the most abuse. Even in referring to floors in residential structures, we must bear in mind that wooden floors are shellacked, varnished and polished quite often. In many cases, wooden floors are covered by rugs, linoleum, or various types of tile. In this paper we are dealing with masonry members, and we refer specifically to floors in industrial and commercial establishments—whether they be interior and surrounded by walls and covered by a ceiling or roof, or whether they be exterior floors such as building ramps or airport runways. In this respect, we could conceivably classify roadways on highways, bridges, tunnels, or airports as floors. We will deal with epoxy applications for such structures in a subsequent section. Here, we will concern ourselves primarily with floors in industrial and commercial plants where the material of construction is usually concrete, where abuse is of both a physical and chemical nature, and where maintenance of these floors has always been a problem.

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Protecting Concrete Floors

The need for providing resistance and protection to such concrete floors has long been recognized and many attempts have been made to fill this need. The usual and most economical procedures have been to paint these floors. Oil, varnish and alkyd paints have been used on concrete floors with varying degrees of success. Usually poor caustic resistance causes these films to saponify and deteriorate. Resistance to abrasion is fair and chemical resistance is not very good.

More recent developments in synthetic resins have provided the materials mentioned in Part I, May —the butadiene styrenes, the chlorinated rubbers, the vinyls, the acrylics, etc.—all being caustic resistant. The degree of abrasion resistance varies as well as the degree of adhesion. All have fairly poor solvent resistance since they can be redissolved in the solvents from which they were cast.

Attempts have also been made to develop superior wearing and water resistance concrete by the use of neoprene latex, mineral fillers, polyvinyl acetate, sodium methyl siliconate, etc. as additives for Portland cement concrete. Results are not usually considered satisfactory.

With the advent of epoxy resins, it became possible to formulate thermosetting floor paints with characteristics of superior adhesion, abrasion and chemical resistance. Many of these coatings are formulated

from epoxy-fatty acid esters, short to medium in oil length, and in one package systems. These, however, are not as resistant to abrasion and chemical attack as the systems which are based on polyamine cured epoxies in a two component system.

We have been dealing here essentially with paint systems which apply a film thickness of one to five mils at most. There still remains the problem of how to treat badly worn floors—whether worn from chemical attack or physical abrasion. The possibility of using a thermosetting resin which could be applied without solvent and which could cure to an infusible mass without shrinkage has long been sought. Liquid epoxy resins, of low viscosity, provide this possibility today.

All conventional floor topping materials have one major drawback—they are inherently incapable of bonding permanently to concrete. Extensive chipping, cutting, jack-hammering or other preparatory work is required to insure a mechanical key or underlock between the topping and the old flooring.

Epoxy Compounds

The topping compounds under discussion here literally weld to any masonry surface. The bond is far stronger than the concrete itself and will provide adhesion not only to masonry, but also to wood and ferrous and non-ferrous metals. The topping is tremendously resistant to wear and impact. It is completely waterproof, unaffected by aging or temperature change, and impervious to greases, oils, detergents, alkalis, acids and many chemicals. It neither shrinks nor expands during curing or upon aging and it can be featheredged.

A typical formula is based on a liquid epoxy resin such as "Araldite" 6020, which has an epoxide equivalent of 208 and an average viscosity of 19,000 centipoises (Z_6). To reduce this high viscosity without the use of volatile solvents, we may use a reactive diluent such as butyl glycidyl ether which is a monoepoxide and will take part in the curing reaction. In order to obtain a viscosity low enough to be able to take a high loading of sand aggregate, the epoxy resin is reduced to a viscosity of F-H (Gardner-Holdt) with the butyl glycidyl ether.

The hardener, in turn, also has to be low enough in viscosity to contribute easy troweling properties to the mixture. At the same time, it is desirable to use a hardener which will contribute some degree of flexibility to the cured mass, because it will be subject to great compressive, tensile, impact and flexural stresses. There are a number of such hardeners available among which are the polysulfides—such as "Thiokol" LP-3, viscosity = 1200 cps, (Thiokol Chemical Corp.), the polyamides—such as "Versamid" 125, viscosity = 13000 cps, (General Mills), and resinous polyamines—such as "Lancast A," viscosity = 800 cps, (CIBA Company Inc.). The "Versamid" and the "Lancast A" have the ability to cure without the help of any additional catalysts. The "Thiokol" LP-3 must be used in conjunction with an amino catalyst.

There are also reactive diluents available, long chain bisphenols containing an epoxide ring, which contribute to the flexibility of the hardened epoxy resin. One such diluent is "Cardolite" NC-513 (Minnesota Mining & Manufacturing Co.).

So far, in the entire system, we have utilized materials of minimum irritation potential. To carry this through all the way, we would have to use an amino catalyst with low irritation potential. Tertiary amines, in contrast to primary and secondary amines, have this characteristic. They also contribute to crosslinking of the epoxy resin rather than linear polymerization, which is the primary method of cure of the "Thiokol," "Versamid" and "Lancast A" hardeners. The crosslinking contributes to greater water, solvent and chemical resistance. In this formulation we use DMP-30, a "Mannich" type base (Rohm and Haas Co.).

At this point we might clarify the use of the terms "hardener" and "curing agent"—since they seem to have occurred interchangeably throughout this paper. The term "curing agent" has generally been used in conjunction with protective coatings based on hard epoxy resins. The term "hardener" has generally been used in conjunction with structural applications based on liquid resins—such as castings, laminations, adhesives, etc. However, although we are using liquid resins in what can rightfully be called coatings applications, we will try to be consistent and still use the word "hardener" with the liquid epoxy resins.

A recommended formula is as follows:

Materials	Pounds	Gallons
Part A—"Araldite" 6020+Diluent	259	28.0
Part B—Hardener Blend	51	6.3
Part C—Sand Aggregate	1440	65.7

Aggregate

The nature of the sand aggregate is as important as the resinous component. The aggregate may be composed of dry silica sand, quartz sand, flint shot or carborundum grit. Marble, granite, brick, dry cement, or other masonry dust may be used to match color with the surfaces to be repaired. Or else, dry pigment such as iron oxide, chromium oxide or titanium dioxide, tinted with chemically resistant colors, may be used to shade the aggregate. Three per cent of pigment, based on total aggregate, is sufficient to provide depth of color. A recommended mesh size for the aggregate is 40-60, although it is recognized that a mixture of mesh sizes produces a nesting effect which contributes to greater strength. A fine mesh size of 80 would produce a smooth finished surface, but would also have a higher oil absorption and couldn't load the resin matrix as fully. A coarse mesh size of 30 would produce a more non-skid surface, would load the resin matrix more fully, and would make for better troweling properties. A mixture of these mesh sizes is used quite widely. It is also important to specify that the aggregate be dry and salt-free.

The manner of packaging of a flooring compound will vary. Some manufacturers prefer to package the epoxy resin and the hardener in two compartments with instructions for using the proper grade of aggregate. Others will package the sand as a third component—to make sure the proper type is used. Still others will blend the sand, color and epoxy

resin in one component, and package the hardener as the second component. The units will vary in size from one pound, do-it-yourself kits to five hundred pound heavy industrial kits.

Properties

What about chemical and physical resistance properties? Bricquets, cast from the mixed compound and cured for seven days, were immersed in a wide variety of chemicals for two months. Table I analyzes the results.

Physical properties were compared to the properties of concrete. The concrete mix was as follows:

Type 2 cement	—one part by volume
Sand	—two parts by volume
3/8" gravel	—three parts by volume

Water added to proper working consistency.

The following test procedures were used. Test results are given in Table II.

Impact Strength was determined, at 32°F and 75°F, by the falling ball method on the following samples:

1. Concrete, 2" thick, after 28 days cure.
2. Flooring compound formulation after 28 days cure.

The flooring compound specimen was prepared by applying a ¼" layer of the flooring compound to 2" thick concrete that had been cured for 28 days. Specimens 6" by 6" were used for these tests.

Tensile Strength was determined on concrete and the flooring compound formulation after 28 days cure. Specimens conforming to the outside dimensions of the tensile specimen illustrated in A.S.T.M.-D651-48 were used for these tests. The specimens were tested on a universal testing machine and the speed of the movable head of the testing machine was 0.05 inches per minute.

Abrasion Resistance was determined on concrete and the flooring compound formulation after 28 days cure. The specimens were tested employing an abrasion tester with 60 grit carborundum cloth as the abrasive media. The specimens were tested under a load of 88 ounces and the abradant was renewed every 100 cycles.

Shrinkage was obtained by casting bars, 12" by 1" by 1", of concrete and the flooring compound formulation. The length of the cavity of the mold was measured to the nearest 0.001 inch. The length of the test bars was measured after 3, 7 and 28 days cure to the nearest 0.001 inch. The shrinkage per inch was calculated by subtracting the specimen dimension from the cavity dimension and dividing the difference by the cavity dimension.

Rockwell Hardness was determined on the M scale using a ¼" ball penetrator and 100 kilogram major load. Rockwell hardness values were obtained on concrete and the flooring compound formulation after 28 days cure.

Flexural Properties were determined on the flooring compound formulation after 28 days cure. The sample was prepared by applying a ¼" layer of flooring compound to 1/8" thick cold rolled steel. The specimen was tested as a simple beam on a 10 inch span, and load applied at the center with a universal testing machine. The speed of the movable head of the

10% Nitric Acid	Unaffected
20% " "	"
40% " "	"
50% " "	"
10% Sulfuric Acid	"
20% " "	"
40% " "	"
50% " "	"
Concentrated Sulfuric Acid	Compound etched after 24 hrs.
10% Hydrochloric Acid	Unaffected
20% " "	"
40% " "	"
50% " "	"
10% Sodium Hydroxide	"
20% " "	"
40% " "	"
50% " "	"
50% Citric Acid	"
Concentrated Phosphoric Acid	"
5% Acetic Acid	Compound etched badly in 24 hrs.
Glacial Acetic Acid	Compound destroyed in 24 hrs.
10% Chromic Acid	Unaffected but surface discolored
Lactic Acid	Unaffected
50% Boric Acid	"
Orange Peel Oil	"
Skydrol 500	"
Gasoline	"
Fuel Oil	"
High Octane Gasoline	"
Solvents —	
Toluene	"
Xylene	"
Mineral Spirits	"
Carbon Tetrachloride	"
Citrus Juices	"
Sugar Solution	"
Molasses	"
Lime	"
Ammonia Fumes	"
10% Hydrogen Sulfide	"
Weatherometer Exposure	Unaffected after 2000 hrs.
Salt Spray Resistance	" " 500 hrs.

Table I

Test	Value Obtained: Flooring Compound	Concrete
Impact Strength, ft. lb.		
32°F., 28 day cure	12.3 ft. lb.	10.0 ft. lb.
75°F., 28 day cure	12.3	10.1
Tensile Strength, psi.	1430 psi.	—
Abrasion Resistance, Average loss in thickness per 1500 cycles, in.	0.0040 in.	0.0255 in.
Shrinkage, in. per in.		
3 day cure	0.0010 in.	0.0012 in.
7 day cure	0.0010	0.0012
28 day cure	0.0010	0.0012
Rockwell Hardness	M71	M64
Flexural Strength, psi.	22,800 psi.	—
Modulus in Flexure, psi.	4.55×10^6 psi.	—
Deflection at Break, in.	0.465 in.	—
Compressive Strength, psi.		
3 day cure	6,610 psi.	3,110 psi.
7 day cure	8,260	3,590
28 day cure	8,270	3,730
Adhesion to Steel, psi.	1,260 psi.	—
Vicat Softening, 75° to 400°F., Penetration, mm.	0.480 mm.	—

Table II

testing machine was 0.05 inches per minute.

Compressive Strength was determined on concrete and the flooring compound formulation after 3, 7 and 28 days cure. The specimens, 2″ by 2″ by 2″, were tested on a universal testing machine and the speed of the movable head of the testing machine was 0.05 inches per minute.

Adhesion to Steel was determined on the flooring compound formulation after 28 days cure. The specimen was prepared by applying a ¼″ layer of flooring compound between two pieces, 1″ by 1″ by 1″, of cold rolled steel. The prepared specimen was tested for sterngth in tension perpendicular to the face of the specimen.

Softening was determined on the flooring compound formulation after 28 days cure. The sample was tested using a Vicat penetration tester. The specimen was tested under a load of 3000 grams bearing on a one square millimeter flat ended needle. The penetration, in millimeters, was determined over a temperature range of 75° to 400°F.

Various practical expedients have been devised by contractors and manufacturers to ease the application of the compound. On some surfaces, it is advisable to apply a thin coating of the compound minus the sand aggregate before applying the fully mixed compound. On wooden floors, this is especially recommended, and it is also advisable on wooden floors to secure a wire mesh or grid to the floor before applying the compound. Some applicators will heat the sand before adding to the mixed resinous components to improve troweling properties and to speed the hardening process. There is one patent on a trowel which is electrically heated, like a laundry iron. It reduces viscosity of the compound on contact, eases troweling and speeds hardening. Trowels constructed of Teflon or polyethylene have been used—epoxy resins do not adhere to these materials, slipping off the surface very easily. In some cases, additions of very small percentages of dibutyl phthlate, pine oil, or even solvents such as xylol, are utilized to ease working properties. These latter methods will affect chemical resistance properties to some extent and any solvents used will eventually leave the film—affecting the physical properties too, although steel trowels are usually dipped in xylol or diacetone alcohol to smooth the surface of the applied compound. The use of infra-red lamps has become an accepted method of speeding the hardening process—even at normal room temperature. At temperatures below 50°F., external heat is a necessity. This method has been used very effectively to harden the compound even in freezer-lockers.

A word about preparation of surfaces would be in order here. Surfaces must be free of grease, oil, dirt, loose particles and efflorescence. A clean surface makes for the greatest degree of adhesion. Cleaning may be accomplished by sandblasting, wire-brushing or grinding. Steam cleaning of greasy surfaces is better than solvent cleaning which can spread the grease into the surface pores. Chemical or acid cleaning is often used, followed by thorough rinsing. The surface should be absolutely dry before application and during the hardening process.

Some areas of application, other than actual floors, are as varied and interesting as an imaginative mind can make them. The compound has been used to line silos; to build and repair airport runways; to repair and finish swimming pools; to line cooling tower pans; to repair cracks and spalls in concrete restoration and as a tuck-pointing mortar; to line tanks; to provide non-skid areas at tunnel, bridge and toll-station approaches as well as at slippery points on roadways and bridges; to set up heavy load receiving docks and non-skid ramps; to build non-skid stairs and ship decks; and by being made conductive, has been used in hospital operating rooms to ground static electricity. Figures 1-3 show an operation and an application at a warehouse area of a department store.

Epoxy cement has found its place in use with masonry. Its application possibilities are only as wide as the imagination of the engineer and architect will permit.

(Part III will appear in the July issue)

Acknowledgement
Photos—courtesy of Protex-A-Cote, Inc., Newark, N.J.

Figure 1. Preparing floor area for epoxy topping.

Figure 2. Mixing epoxy compound and sand aggregate.

Figure 3. Trowelling epoxy flooring compound.

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The author continues his random reflections on various aspects of the paint industry. The opinions expressed in this column are his alone and do not necessarily reflect those of this publication.

Needle in a Haystack

I'D like to report on a recent conversation with a former paint colleague who now heads a literature research section for a well known organization. My friend had just returned from a meeting on documentation research whose theme had been based on this fact: the huge and increasing volume of chemical knowledge stored away in the literature makes rapid location of specific information more and more difficult. *It is sometimes easier to repeat work known to have been published than to find reports thereof.*

Electronic computers, selectors, and punch card systems could facilitate the search, but "unfortunately," he said, "the high initial costs involved in setting up an efficient information system deter the faint-hearted and the short-sighted.

"What they overlook," he pointed out, "is that laboratory research is two to three times more costly than literature research (depending upon the industry.) I'll wager the chemical industry could save up to $200 million in research money each year simply by improving its information services.

"The longer we put off inevitable modernization, the more reading material piles up for eventual reclassification. Do you realize," he asked, "that last year alone about 400,000 scientific articles were published? And that next year's figure will probably top that? Amidst this profligacy, top-notch library facilities are a sound investment.

Phil Heiberger

So Much Gravy, So Little Meat

"The worst of it is that as article output increases, the proportionate amount of new information decreases." Then, with a bit of a twinkle in his eye, he added, "You guys in the paint industry are no better than the rest."

My dander up, I demurred, "You left the industry before the big push of epoxies, polyurethanes, latex paints, and. . ."

"Bunk," he interrupted. "These advances are due to new products developed by the large chemical companies. What has the paint industry itself contributed? Its real problems are pigment dispersion, adhesion, corrosion, rheology, and weathering. In these areas you have little to boast about.

"As a documentation expert, I'm concerned with classifiable contributions, not sales blurbs. Fancy Latin squares and statistical gibberish may tend to camouflage inconclusive findings for the average reader, but the person who tries to abstract for card index files notices how much is meat and how much gravy."

Easy Does It Not

"Aren't you a bit out of touch with paints to make such a bald statement?" I asked.

"Not at all," he replied. "I often participate in cooperative programs and 'Ive discussed this point with others many times. It disturbs me to see industry-wide effort expended on laboratory experiments with small merit. There

seems to be a deliberate shying away from problems that promise to be difficult.

"For example, when somebody claims that additive goo will convert discarded motor oil to a hard, colorless air-drying paint vehicle, every man in the business rushes to verify the claim. But when somebody reports that 'polar adsorption' is responsible for many paint properties, few ask for a definition of 'polar adsorption.' More important, little effort is made to find ways of putting this effect to work.

The Bet

"Just a minute," he said, pulling a familiar blue magazine out of his briefcase. "See? I still keep up with your field. Have you read this article, 'Selective Polar Adsorption and Some Rheological Phenomena in Paint Systems,' by L. Dintenfass (February 1958 issue of Journal of the Oil and Colour Chemists Association, **41**, 125-129)?"

"Not yet," I apologized.

"Well, I'm willing to bet that when you do you'll find this article alone invalidates at least half of the published research in the paint industry.

"Multiply this situation by the number of industries extant, and you'll understand my great concern. I'm the one who has to wade through, abstract, classify, and hunt for information that's playing hide and seek."

The Payoff

This bold claim demanded investigation. You'll want to know my findings. To prove my librarian friend was right, I will summarize the Dintenfass article and quote a few pertinent highlights.

Dintenfass

The article discusses the effect of polar adsorption on the dispersion and wetting of pigments and resultant rheological srtuctures. Thixotropy, viscosity, and yield value of paint systems are reviewed, and the effect of dilatancy of the paint vehicle is considered. Some criticism is made of former methods of approach to these problems.

"The main aspects which concern the paint industry are the effect of adsorption in the processes of wetting and dispersion of pigments, adhesion of paint films to the substrate, corrosion of metallic substrates, changes in the rehological properties of paint vehicles and the ageing and weathering properties of paint films, the latter due to adsorption-desorption phenomena which can involve photoadsorption effects."

"Perhaps the most important factor in the adsorption of molecules onto solid surfaces is the heterogeneity of these surfaces. . . Apparently the surfaces of pigments, extenders, etc., consist of a number of distinctive active areas, each particular area adsorbing selectively a specific type of polar group."

"The total surface area of the pigment appears to be the sum of the individual active areas, and, in some cases, of nonactive areas. Every pigment, or solid surface, can be characterized by the size, number, and types of these individual areas. This gives a finger print of the pigment, which apparently depends more on the origin and history of the pigment (or surface) than on its chemical structure."

Continues Dintenfass, "The effective dispersing power of a wetting agent will depend on the surface characteristics of the pigment and on the type of polar group of the wetting agent. The most efficient wetting agent will be that one the polar group of which corresponds to the largest active area on the pigment surface."

"Thus, there exists no universal wetting agent, the optimum type of wetting agent varying from pigment to pigment. It is worth mentioning that the acid value of an alkyd resin is not indicative of its wetting and dispersing properties. The reason is that the performance of an alkyd resin will depend on its colloidal state (aggregation, coiling, association) which in turn is influenced by the solvent used."

"Similarly, due to the heterogeneous nature of solid surfaces, the common type of measurement of surface areas by so-called oil adsorption is not only inaccurate but quite misleading."

Dintenfass discusses resin-pigment interactions. "The effect of adsorption of a certain fraction of the resin or polymer from the paint vehicle can cause, at times, completely new rheological characteristics in these vehicles. The adsorption can change the molecular weight distribution of the vehicles. . . . In paint vehicles based on poor solvents, where the resin molecules are aggregated to some extent, the adsorbed fraction will correspond to low molecular weight resin which serves as plasticizer and solvent for the high molecular weight fraction. The removal of this low molecular weight fraction by adsorption causes a change in the molecular weight distribution of the paint vehicle with subsequent decrease of solubility, and increase of the degree of aggregation of the non-adsorbed vehicle. This leads to dilatancy, and even to precipitation of the paint vehicle. The latter phenomena causes agglutination of pigment particles."

"A very important rule should be stressed: the solubility of the paint vehicle after pigmentation is a great deal below the level of the solubility of the original clear vehicle. Correspondingly, the molecular weight of the clear and pigmented vehicle may differ a great deal."

A discussion of colloidal shock follows and the author states that "coiling and aggregation of polymer molecules and the mechanism of colloidal shock are largely responsible for seeding, skinning, and some other undesirable phenomena."

"The adsorption-influenced colloidal structure of the paint vehicle will have an influence on the phenomena of adhesion, corrosion, and ageing of paint films." One aspect of paint film ageing is that "The ageing of paint films can involve changes in the adsorption-desorption equilibrium on the substrate-film and pigment-vehicle interfaces. . . .this would indicate that paint vehicles containing different polar groups, and therefore adsorbed on different active areas of the same pigment particles, will behave differently on exposure (disregarding the ageing of the polymer itself.) This means that one and the same vehicle could behave differently with different pigments, because the ratio and size of active areas of these pigments vary."

why Firestone makes 5

Exon engineers meet demands of various types of protective coatings with resins pin-pointed to specific needs

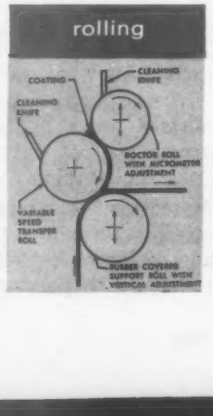
Each method of applying protective finishes must answer special needs to do its job best. With some, it's the ability to adhere to metal; with others, it's stripping ease. Because of these diverse requirements, Firestone engineers have developed 5 different Exon solution resins. Each is engineered to meet the needs of particular finishes.

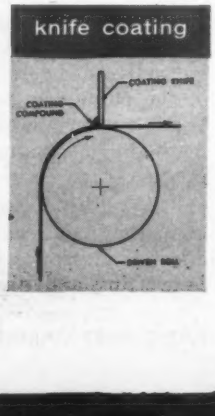
Exon solution resins differ in solubility and adhesion to fit precise requirements of various solution coatings. Each is resistant to chemicals, abrasion, corrosion and weather. All dissolve quickly in appropriate solvents.

No wonder manufacturers of solution coating turn to Firestone Exon solution resins to solve their production problems. Consider your own. Then, for a solution resin pin-pointed to the best answer for you, check with Firestone.

EXON 450

For low cost strip coatings. Good solubility, tensile strength and durability.





different solution resins...

EXON 461

A unique fluorine-containing resin combining high solubility, unusual chemical resistance, heat stability, and weatherability.

EXON 470

Excellent adhesion to metals, alkyds, vinyl surfaces. Compatible with wide range of drying oils, alkyds, phenolics, melamines. High solubility in low-cost solvents.

EXON 471

Excellent for weatherability and durability in a protective coating. Corrosion resistant.

EXON 481

Makes possible high strength, colorful, abrasion-proof coatings that resist fading or cracking.

Firestone

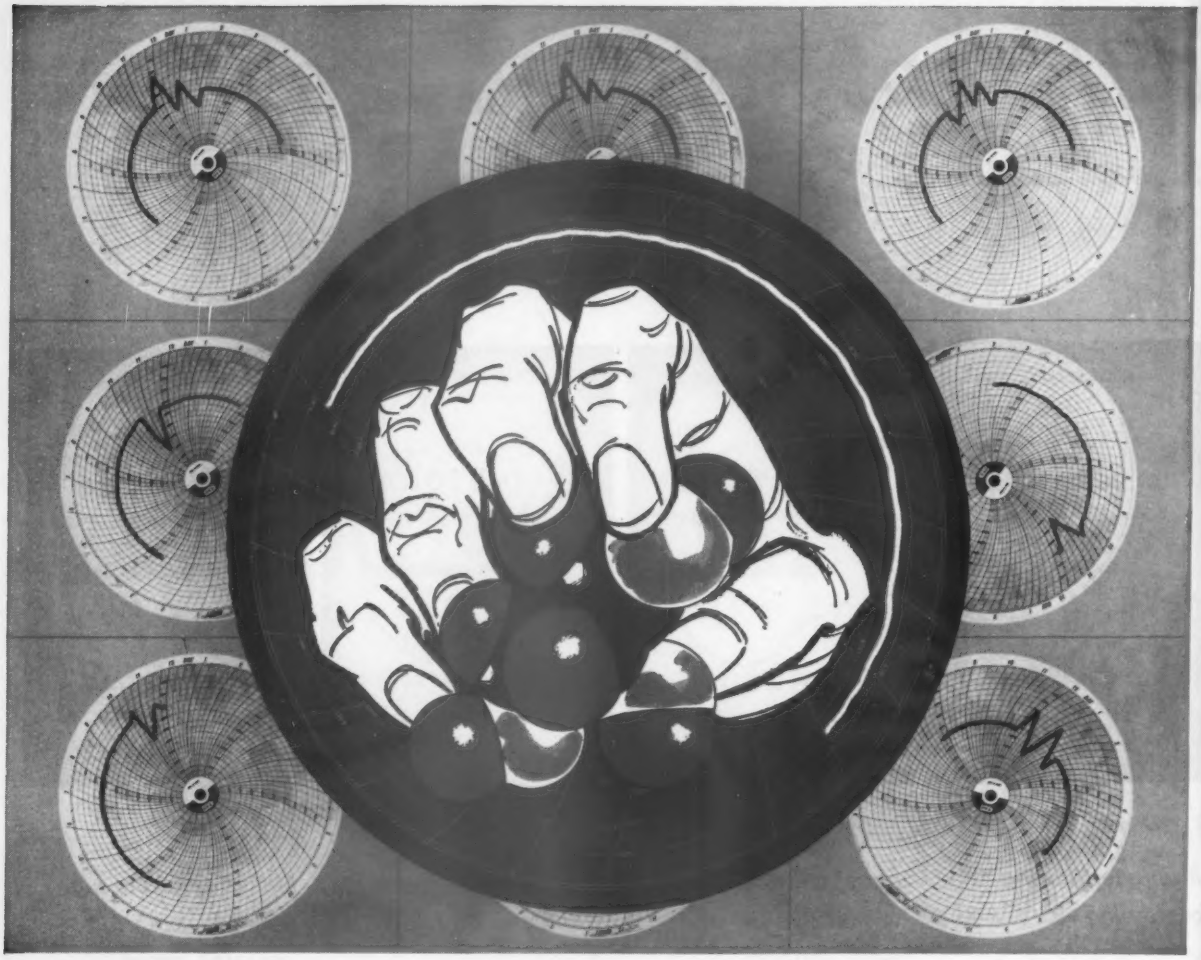
Industry's Most Complete Line of Vinyls Engineered to Your Specific Needs

For complete information and technical service, call or write:

CHEMICAL SALES DIVISION: FIRESTONE PLASTICS COMPANY

DEPT. 830H POTTSTOWN, PA. • A DIVISION OF THE FIRESTONE TIRE & RUBBER CO.

IN CANADA, CONTACT CHEMICAL SALES DIVISION, FIRESTONE TIRE AND RUBBER COMPANY OF CANADA, LTD., HAMILTON, ONT



A structure that simplifies cooking

Glycerine has a molecule with three OH combining points for making alkyd resins—two primary, one secondary. In the polymenization reaction, it permits more flexibility, promotes a more uniform structure and reduces the danger of gellation.

Glycerine has other important advantages in making alkyds:

- Its liquid state simplifies handling; permits measurement by volume or weight.
- Its compatability with fatty acids and copolymers makes a wide range of resin properties economically feasible.
- Its chemistry has been thoroughly evaluated. Methods are perfected and literature abundant.

Glycerine's usefulness continues to grow. Stable in price, dependable in supply, Glycerine offers a unique balance of properties. We'd like to send you our 20-page booklet: "Glycerine Terms, Tests and Technical Data." Address your request to the Glycerine Producers' Association.

Properties

HYGROSCOPICITY • STABILITY

SOLVENT POWER • VISCOSITY

NONVOLATILITY • NONTOXICITY

TASTE • COMBINING WEIGHT

Applications

HUMECTANT • CARRIER

SOLVENT • LUBRICANT

SOFTENER • EMOLLIENT

ANTI-FREEZE • ALKYD BASE

GLYCERINE PRODUCERS' ASSOCIATION • 295 MADISON AVENUE, NEW YORK 17, N. Y.

NEWS

Zuck to Head Texas Container Firm

Formation of a new Texas firm, the Southwestern Steel Container Co., was announced by Gordon D. Zuck, president.

G. D. Zuck

With home offices and manufacturing plant in Dallas, the new firm will manufacture a full line of steel shipping containers for petroleum, paints and industrial chemicals. It will serve the needs of varied industries throughout the southwest area.

Mr. Zuck, who is also president of Vulcan Steel Container Co., with plant and headquarters offices in Birmingham, Ala., has been in the steel shipping container business since 1932.

Mr. Zuck emphasized that the new Texas Company will be an independent, self-sustaining operation.

Modern facilities will be available for producing all popular styles and sizes—both open and closed head, hi-baked protectively lined containers with all standard pouring openings, and lithographed or printed for market use.

Officers of the new company, in addition to Mr. Zuck, are: Fred A. Kusta, vice president; Charles B. Little, Jr., vice president and sales manager; and Ruth J. Zuck, secretary-treasurer.

•

Roon Award Papers

An invitation for the submission of technical papers for the second Roon Foundation Awards competition has been issued by the program committee for the 36th annual meeting of the Federation of Paint & Varnish Production Clubs. The deadline for the receipt of papers is July 1.

The competition aims to encourage and reward the publication of technical papers that contribute to the scientific and practical progress of the protective coatings and allied industries.

There are two classes of awards, one for class A members of the Federation, and an open competition for all other eligible persons. First, second and third prizes of $450, $250 and $175, respectively, will be awarded for the winning papers in each class.

Abstracts of 200 to 300 words must accompany seven copies of each paper which should be sent to Harry Kelfer, Chairman 1958 Program Committee, Dept. PVP, c/o Sterling Quality Products, 184 Commercial St., Malden, Mass.

•

Name Change

The National Cylinder Gas Co. has announced that the directors have voted that the company name be changed and are asking stockholders to approve the proposed name, Chemetron Corp.

•

Cab-O-Sil in Production

Godfrey L. Cabot, Inc., Boston, Mass., has announced that the first American-made Cab-O-Sil is now in production. The chemicals division of Cabot Carbon Co., a subsidiary of the firm, recently completed a plant at Tuscola, Ill. for the production of silicon dioxide and eventually other metallic oxides.

The plant is expected to have an annual capacity of 5 million pounds of silicon dioxide.

Sales Consultant Named

E. A. Orem has become associated with Amoco Chemicals Corp., Chicago, as a sales consultant.

Mr. Orem had previously been associated with Du Pont.

In his new capacity, Mr. Orem will assist the company in the areas of selection and training of sales personnel.

•

Experimental Store Opens

United Wallpaper, Inc. opened an experimental paint and wallpaper store in Hillside, Ill.

The purpose of the store is to determine the most effective methods of merchandising and selling home decorating products at the retail level.

•

Formulation for Government

A formulation has been developed and published by the Rohm & Haas Co. to meet the requirements of two recently issued government specifications for white acrylic emulsion paints for exterior use.

Formulation 178 meets the specified requirements for a vehicle consisting of an acrylic polymer dispersed in water.

Either of the firm's acrylic emulsions, Rhoplex AC-33 or the new Rhoplex AC-55 can be used to make the durable paints described in the federal and military specifications.

BOARD MEETING: Directors of Coatings Research Group, Inc. holding their spring meeting recently in Cleveland. Seated left to right: H. P. Ball, vice president; H. S. Felton, past president; J. G. McMurtry, treasurer; B. F. Swackhamer, president; F. J. Derrick, Jr., secretary; and W. O. Schwarz. Second row, left to right: J. E. Lamontagne; E. M. Fairbrother; E. L. Gott; A. K. Stephens; D. W. Greene; C. B. Athey; E. G. Carlson, Jr.; and R. Baker. Third row, left to right: J. C. Moore; W. D. Cochran; C. L. Smith; N. D. Cota; F. Gerke; L. O. Hawkinson; and H. Berman.

NEWS

Infrared Spectroscopy Institute Scheduled

The second annual Infrared Spectroscopy Institute, geared to the needs of industrial personnel, will be held at Canisius College, Buffalo, N. Y., from August 25 to 29.

Designed for those with little or no experience in the field, the program will cover the elementary and advanced theory of infrared spectroscopy, its industrial applications and its future in research and industry.

The Institute schedule includes morning and afternoon classes, with lectures supplemented by laboratory practice in the interpretation of spectra and the solving of problems. Single and double-beam instruments, including the newest low-priced spectrophotometers, and an extensive spectral library will be used by the participants.

The lecturers for the Institute will be: Dr. Herman A. Szymanski, Canisius College; Dr. Robert T. Conley, Canisius College; Dr. Richard E. Stanton, Canisius College; Dr. Leonard A. Woodward, Oxford University; Brother Columba Curran, C.S.C., Ph.D., University of Notre Dame; Dr. Van Zandt Williams, executive vice president, Perkin-Elmer Corp.; Dr. David Z. Robinson, assistant director of research, Baird-Atomic, Inc.; Jack L. Alexander, senior spectroscopist, Koppers Co., Inc.; Donald A. Herbert, W.N.Y. sales manager, Beckman Instruments, Inc.; Norbert C. Helmer, Head, analytical research group, Allied Chemical & Dye Corp.; and Leroy H. Bille, analytical laboratory, Allied Chemical & Dye Corp.

Registrations and inquiries may be addressed to Dr. Herman A. Szymanski, Director of the Office of Scientific and Industrial Research, Dept. PVP, Canisius College, Buffalo 8, N. Y.

•

W. Dudley Peet Dies

W. Dudley Peet, 71, secretary and director of Beck, Koller & Co. (England) Ltd., recently died. His firm is a British affiliate of Reichhold Chemicals, Inc.

Mr. Peet, appointed secretary of the firm in 1933, and elected a director in 1947, was still quite active with the company at the time of his death.

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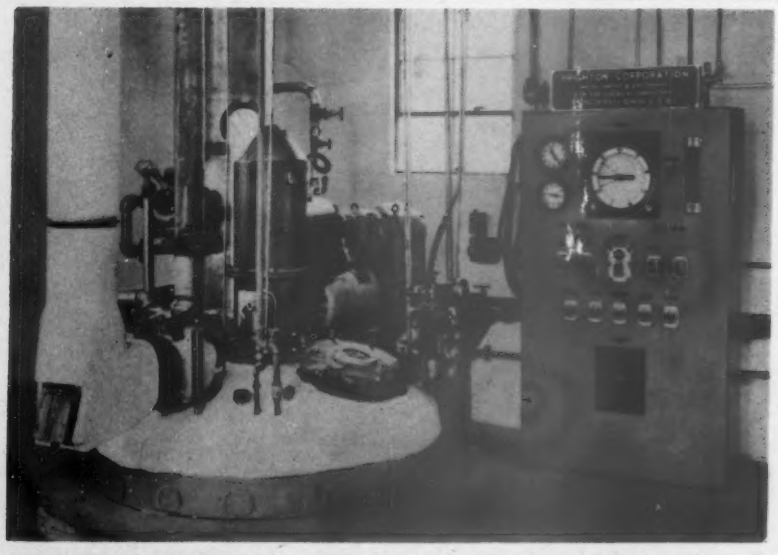
Company Moves

The southern chemical division of the Glidden Co. announced a move of the Chicago office to new quarters in the Board of Trade Building, 141 West Jackson Blvd.



GAS KETTLE REACTOR: The Foy Paint Co., Cincinnati, has installed and placed in operation a 1,000 gallon capacity Gas Kettle Reactor for processing synthetic resins. The automatic installation is designed to cut costs of manufacturing and produce better quality, uniformity, consistency, color and viscosity in alkyds. Cooking time is reduced and hot-spots are eliminated.

Bosch Accepts Post At U. of Missouri

Dr. Wouter Bosch has been appointed Professor of Chemistry at the University of Missouri, School of Mines and Metallurgy, effective September 1. He has resigned as chairman of the department of paints, varnishes and lacquers at North Dakota Agricultural College.

Dr. W. Bosch

In his new position, Dr. Bosch will teach senior and graduate courses in paint and polymer chemistry and will conduct graduate research on the Master's and Doctor's levels in the same fields.

Before leaving his present position, Dr. Bosch will teach the following paint courses at North Dakota Agricultural College: Third Paint Short Course for High School Chemistry Teachers, June 24-July 1; Eleventh Paint Short Course for Beginners, July 7-18; and the Eighth Advanced Paint Refresher Course, July 21-August 1.

•

Sales Agent Appointed

The C. M. Kemp Manufacturing Co. has announced the appointment of Jobe & Co. as the exclusive sales agent for Kemp equipment in Maryland, Virginia and the District of Columbia.

The agent has offices in Baltimore, Richmond and Washington, D.C.

•

Headquarters Relocated

The American Can Co. has moved its Chicago headquarters to a new building at 200 South Michigan Avenue, it has been announced.

NEWS

New Vinyl-Type Coating Developed

A new organic protective coating for household appliances, known as "Dynakote," has been developed and patented by Canadian Industries Ltd., Montreal. In resistance to attack by chemicals and moisture, it is said to bring an entirely new order of performance.

"Dynakote" is recommended for virtually all major appliance lines, such as for liners and outer shells of refrigerators, inside and outside surfaces of washers and driers and side panels on stoves. It combines the adhesion and ease of application of alkyd-base enamels with the rich gloss of vitreous.

"Dynakote" enamel represents a new concept in an oil-free baking finish. It is based on a cross-linked vinyl copolymer vehicle which easily exceeds other modern vehicles in resistance to chemicals, heat and moisture.

"Dynakote" possesses high gloss and depth of appearance qualities and gives excellent resistance to detergents. It is also effective in hiding sand scratches or metal texture.

When exposed to a high temperature, the panel at left, finished with an ordinary enamel, turned a dull brown. The panel at right, finished in "Dynakote," retained its original whiteness and high gloss.

EXPANSION PROGRAM: Shown above is a portion of the new control laboratory in Pacific Vegetable Oil's Richmond, Calif. division. The new facilities, dedicated April 18, are part of a continuing expansion plan and will vastly increase the research and development capacity of PVO.

"Dynakote" surfaces can be readily repaired either in the appliance-makers plant during fabrication or in the field after shipment. Defective areas are sanded smooth, and the reduced repair enamel may be sprayed with normal touch-up guns. The repaired patch can either be air-dried for 30-60 minutes or given an infra-red spot bake of 10-20 minutes before polishing. Another advantage is the extremely fast set-up or dust-free time of "Dynakote" enamels.

The basic research of "Dynakote" stemmed from the belief that certain vinyl copolymers could contribute a new measure of chemical resistance to a trouble-free, high-solids enamel. The problem was to create an enamel that could be applied by the usual techniques.

In experimenting with various cross-linking mechanisms, the C-I-L team began to uncover products with adequate storage stability, excellent flow during baking and remarkable adhesion to phosphate-treated steel and aluminum. Significantly, these cross-linked vinyl copolymers registered a new high in detergent resistance. The ultimate products proved to be unusually resistant to chemical and moisture attack, staining and kitchen yellowing, and heat discoloration.

Now commercially available, "Dynakote" is offered in white and a wide range of colors. It's readily reduced with aromatic hydrocarbon solvents, toluol, xylol and other solvents. It is designed for application over steel treated with a good phosphating process or over alodized aluminum.

Formulations of the enamel have been developed for the techniques commonly found in appliance plants. These include flow-coating, cold-spraying, hot-spraying, and electrostatic-spraying.

•

Curtailment by N. J. Zinc

The New Jersey Zinc Co. announced that it has closed down its mine at Hanover, N. M. and has discontinued roasting operations at its Cannon City, Col. plant.

In addition, substantial cutbacks in production were announced at the company's smelting plants at Palmerton, Pa. and Depue, Ill.

A spokesman for the firm said that these curtailments of operations were made necessary by the continued flooding of domestic markets by foreign zinc.

•

Vulcan Expands

Vulcan Containers, Inc. has expanded its production to include new open head greese drums and 15 gallon open and tight head drums with the new universal diameter of 13 15/16 inches as a production standard.

The new standardized line of drums comply with federal, military and Interstate Commerce Commission specifications.

HARSHAW

Hansa Yellows

Outstanding Clean Bright Strong Toners

Primrose through Lemon and Light Yellow to Medium Chrome Yellows, with advantages of light stability, alkali resistance, and non-sulfur staining.

Exceptionally Soft in Texture
Exceedingly Easy to Disperse
Extra Strong and Economical to Use

Popular with Production Men manufacturing—

Non-Toxic Finishes for Toys
Durable Exterior Finishes
Non-Staining Trim Enamels
Masonry Coatings
Non-Staining Poster Inks
Paper Coatings & Crayons

3D-1120	HANSA YELLOW 10G:	primrose
3D-1500	HANSA YELLOW G:	brighter lemon yellow
3D-1522	HANSA YELLOW GS:	stronger lemon yellow
3D-1542	HANSA YELLOW GW:	light yellow
3D-1632	HANSA YELLOW RA:	medium yellow
3D-1640	HANSA YELLOW R:	reddish medium yellow

For water-dispersed paints:

Aurasperse W-1011: HANSA YELLOW 10G
Aurasperse W-1116: HANSA YELLOW GS
Aurasperse W-1117: HANSA YELLOW R

SAMPLES *and further information will be gladly furnished on request*

The Harshaw Chemical Co.
1945 EAST 97th STREET • CLEVELAND 6, OHIO
CHICAGO • CINCINNATI • CLEVELAND • DETROIT
HOUSTON • LOS ANGELES • PHILADELPHIA • PITTSBURGH
HASTINGS-ON-HUDSON

Glidden announces...

NEW R-11 ZOPAQUE® TITANIUM DIOXIDE

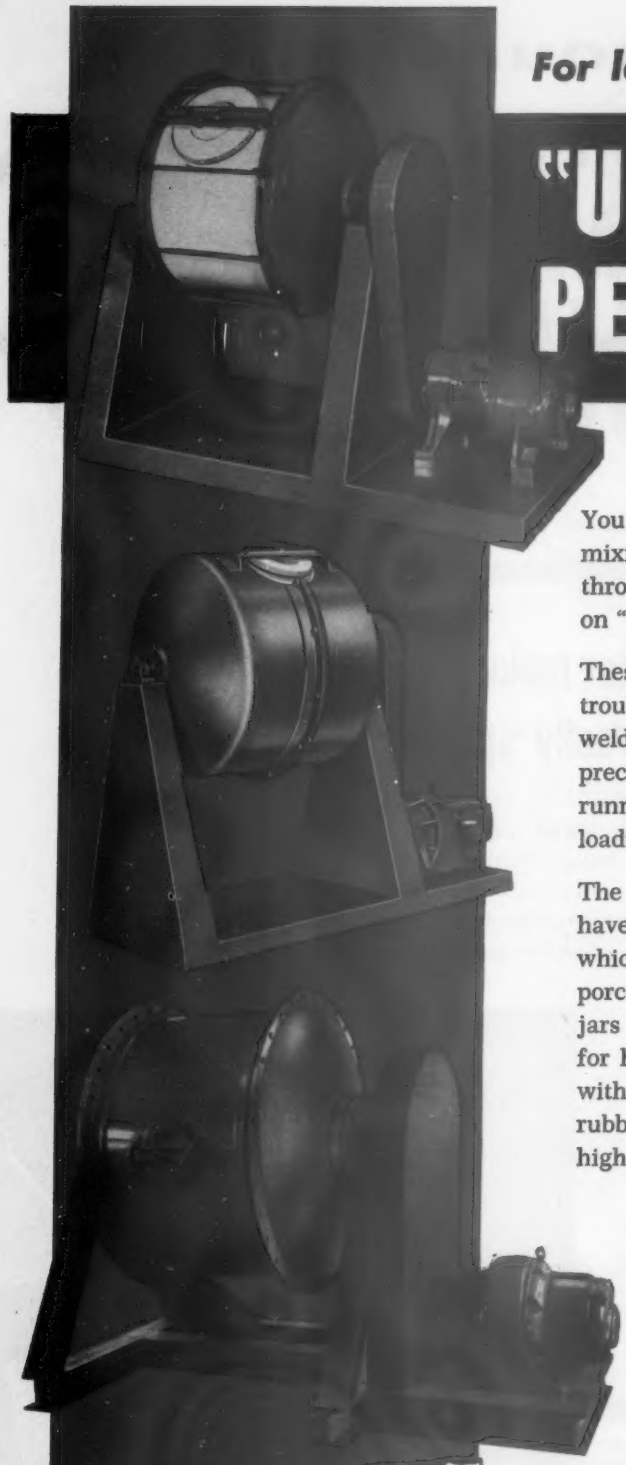
Excellent gloss and color make appliance and product finishes really sparkle

R-11 *Zopaque* rutile titanium dioxide—a new development of Glidden research—is the finest white pigment obtainable for highest quality industrial and baked finishes. Here's why. R-11 *Zopaque* is made up of finer, more uniform particles with greatly improved dispersion characteristics, and provides higher hiding power and greater, lasting whiteness plus cleaner tints.

Perhaps Glidden R-11 *Zopaque* titanium dioxide can help improve the fine product finishes you manufacture. Write now for a free test sample and complete specification data.

THE GLIDDEN COMPANY
Chemicals - Pigments - Metals Division
Baltimore, Md. • Collinsville, Ill. • Hammond, Ind.

QUALITY Glidden PRODUCTS



For laboratory or production . . .

"U.S." BALL and PEBBLE MILLS

You are sure of efficient, uniform grinding and mixing results—from small laboratory batches through full production—when you standardize on "U. S." Mills.

These units are ruggedly built for continuous, trouble-free service and simplified operation. Sturdy welded steel bases, heavy duty bearings, and precision balanced grinding drums assure smooth running. "U. S." Mills have wide mouths for easy loading, positive lidlocks, optional discharge covers.

The 12, 27 and 52 gallon sizes (top illustration) have one-piece Burundum-fortified grinding jars which give up to three times the wear of conventional porcelain. 87, 117, 158 and 210 gallon grinding jars (center) are steel armored. Larger units for heavier production (bottom) are available with steel grinding jars unlined, or lined with rubber, buhrstone, high density porcelain, or high alumina ceramic.

REPLACEMENT JARS

We can supply replacement jars and grinding drums made of our wear-resistant Burundum-fortified porcelain to fit competitive mills. These insure greater strength, longer wear life, and minimum contamination—all at lower cost.

17F

BULLETIN 280 gives helpful data on milling and description of "U. S." Grinding and Mixing Equipment. Write for it today.

PROCESS EQUIPMENT DIVISION

U. S. STONEWARE

AKRON 9, OHIO

SAFFLOWER OIL SUPPLY TO DOUBLE IN 1958!

New Safflower plantings in the Great Plains Area—as well as in California —will assure:

1. A guaranteed supply for all your needs on a long-term contract basis.
2. Stable prices.
3. Lower delivered price at Eastern and Mid-West points.

While production is going up, demand is rising, too. Better check your PVO man for information on a long-term contract at a favorable price.

PVO OILS VARNISH PAINT & PACIFIC VEGETABLE OIL CORP.

Pacific Vegetable Oil Corp.
62 Townsend Street
San Francisco 7, California

1	ATLANTA, GEORGIA G. R. Nottingham Co.
2	BOSTON, MASSACHUSETTS R. B. Huber, Sales Engineer
3	CHICAGO, ILLINOIS Daniel G. Hereley Co.
4	CLEVELAND, OHIO Donald McKay Smith Company
5	DALLAS, TEXAS W. W. Richerson Company
6	DETROIT, MICHIGAN George E. Moser & Son, Inc.
7	HOUSTON, TEXAS Texas Solvents & Chemicals Co.
8	KANSAS CITY, MISSOURI Ack Sales Company
9	LOS ANGELES, CALIFORNIA Pacific Vegetable Oil Corp.
10	LOUISVILLE, KENTUCKY The Argus Co.
11	MILWAUKEE, WISCONSIN J. W. Copps
12	MINNEAPOLIS, MINNESOTA Horton-Earl Co.
13	MONTREAL, CANADA B. & S. H. Thompson & Company, Ltd.
14	NEW YORK, NEW YORK Pacific Vegetable Oil Corp.
15	PHILADELPHIA, PENNSYLVANIA Baker Industrial Oils Co.
16	PORTLAND, OREGON W. Ronald Benson, Inc.
17	SAN FRANCISCO, CALIFORNIA Pacific Vegetable Oil Corp.
18	SEATTLE, WASHINGTON W. Ronald Benson, Inc.
19	ST. LOUIS, MISSOURI Ivan T. Bauman Co.
20	TORONTO, CANADA B. & S. H. Thompson & Company, Ltd.

IDEAS FOR TOMORROW ARE ON OUR FENCES TODAY

Selling quality PE is our business, but so is supplying up-to-the-minute technical information on its properties—and what they can mean to you. That's why at Hercules research on protective coatings of all types is an ever continuing project.

To make this information from our special coatings service laboratory fully useful to you, Hercules maintains a nationwide sales and technical service staff in 12 district offices.

Thus, our facilities are always available to you when you need assistance in solving any coating problem—whether it's in industrial finishes, lacquers, trade sales, or specialty items.

When it comes to the PE itself, manufacturers know they can depend on Hercules to supply a uniformly high-quality product that delivers consistent performance time after time. Whether you're making PE alkyds, esters, drying oils, or other derivatives, you'll find that Hercules PE can help you meet your exact specifications no matter how close they may be.

For a quality pentaerythritol backed up by full technical assistance and nationwide warehouse facilities, just call your nearest Hercules office.

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Synthetics Department

HERCULES POWDER COMPANY

INCORPORATED

900 Market Street, Wilmington 99, Delaware

SP58-2

PE Plants at Mansfield, Massachusetts, and Louisiana, Missouri. Synthetic Resins Plants at Burlington, New Jersey, and Hattiesburg, Mississippi. Sales Offices and Warehouses in all principal cities from coast to coast.

REDUCE YOUR GRINDING TIME WITH

Kentucky's

NEW SOFTEX CHROME GREENS

To reduce your C.P. grinding time, we recommend Kentucky's new Softex Chrome Greens. They provide exceptionally good resistance to darkening on exposure. The shades are bright—the strength good. If you want proof, request samples now.

SOFTEX CHROME GREENS

No. 8904 CP Green, Ex. Lt.
No. 8915 CP Green, Med. Lt.
No. 8930 CP Green, Med.
No. 8946 CP Green, Dk.

Write Technical Service Dept.
For Complete Information

Kentucky Color AND CHEMICAL COMPANY, INC.

Louisville 12, Kentucky

ASBESTINE 325

64 YEARS of production have paid off for International Talc Co. and its customers. As the world's largest producer of magnesium silicate, International Talc Co. announces the availability of their newest member to the family. . . . Asbestine - 325

★ THIS NEW PRODUCT FEATURES

Good dispersion with minimum use of oil needed in grinding. . . . enables formulating at higher pigment volume concentrations. Thereby. . . .

REDUCING RAW MATERIAL COSTS

without affecting performance of storage characteristics.

Also available in other grades. . . .featuring these advantages

- 1. Available in low, medium and high oil absorption
- 2. Pure white — suitable for white or colored paints
- 3. Acicular structure affords good suspension
- 4. Mixes readily in all paint vehicles
- 5. Contributes to greater durability in exterior paints
- 6. Excellent flatting agent for flat or semigloss coatings
- 7. Uniformly low moisture content (less than .5% loss at 212°F.)
- 8. Bulking value 4.2 gallons per 100 lbs.
- 9. Packed in 50 lb. paper sacks for your convenience

PRODUCT OF

INTERNATIONAL TALC COMPANY, INC.

WORLD'S LARGEST PRODUCERS OF TALC

ESTABLISHED 1893

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ASBESTINE 325

S. W. Tuttle, Vice-President

NEW MATERIALS & EQUIPMENT

A MONTHLY MARKET SURVEY

This section is intended to keep our readers informed of new materials and equipment. While every effort is made to include only reputable products, their presence here does not constitute an official endorsement.

COZZONE

AUTOMATIC MICRO-PRINTER
Quick-Change Cylinder

Switching of package imprints and code numbers during production changeovers said to be accomplished in an instant with quick-change plate cylinders called Cozzone Automatic Micro-Printer.

Loosening the cylinder nut permits removal of plate cylinder sleeve for replacement with new imprint.

Available in 18 models offering cylinder circumference ranging from 9″ to 36″. Can be attached to any type of existing or new packaging machinery.

Printer offers option of two-way drive. Position of roller adjusted by numbered and calibrated micro-dials.

Cozzone Marking Co., Dept. PVP, 18 Nuttman St., Newark 1, N. J.

POLYELECTROLYTE
Prevents Flocculation

Alcogum AN-25, a polyelectrolyte which combines the properties of deflocculation and colloidal protection for dispersions of dry powders is available.

Supplied as a water solution. Stabilizes dispersions and emulsions against settling or caking during storage.

Said to improve, in certain applications, spreading characteristics to enhance color by preventing flocculation.

Is easy to handle and will pour from a faucet.

Alco Oil & Chemical Corp., Dept. PVP, Trenton Ave. & William St., Philadelphia 34, Pa.

HANDLING EQUIPMENT
For Drums

Drum-Karrier to provide dependable method of moving 30-gallon drums via monorail or crane.

MORSE

The Karrier, it is claimed, will allow the worker to easily hook it to monorail hoist, crane or chain block, to snap its saddle between barrel chines, to cinch tightly and then to transport, tilt, mix or dispense contents over a receiving tank.

Positive tilt locks hold drum in vertical position during travel and permits easy controlled pouring.

Morse Manufacturing Co., Inc., Dept. PVP, 727 West Manlius St., East Syracuse, N. Y.

CHROME YELLOWS
Exceptional Lightfastness

New line of chrome yellows available at base price of $.35 per pound.

These regal yellows said to show up cleaner and brighter after exposure than conventional types.

Useful in exterior paints and enamels as well as in other applications.

Said to have improved alkali resistance.

Imperial Paper & Color Corp., Pigment Color Division, Dept. PVP, Glens Falls, N. Y.

COLOR-ANALYZER
Percent Reflectance Readings

Color analysis instrument said to permit extremely accurate readings in percent reflectance of paints, dyes and variety of other products.

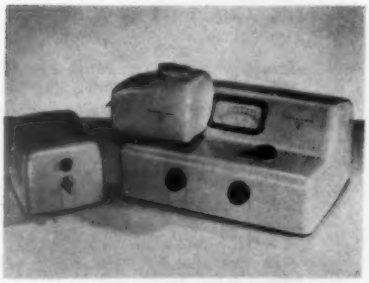
Instrument consists of Spectronic "20" spectrophotometer and a reflectance attachment.

Allows convenient examination of various sized samples.

Analyzer claimed to contain true spherical integrator.

Eliminates need for glass filters. Machine will operate without fluctuation on 50 or 60 cycles. Requires a warm-up period of only five minutes.

Bausch & Lomb Optical Co., Dept. PVP, Rochester, N. Y.

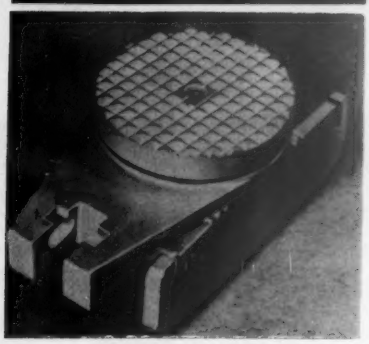


BAUSCH & LOMB

EXPRESS ROLLER
To Move Processing Components

Express Roller offered for storing and transporting heavy, cumbersome or bulky chemical processing equipment in weight ranges from two to 300 tons.

NEW MATERIALS — EQUIPMENT



INDUSTRIAL EAST

Versatile unit (in sets of fours) that work on principle of caterpillar-action.

Units comprise a series of moving rollers locked in endless track which extend above and below a heavy steel frame. Rollers can be moved on small radii in aisles or machinery bays. No screech or grab occurs from straight compression force up to 150 tons.

Industrial East Co., Materials Handling Division, Dept. PVP, Clifton, N. J.

ACETATE SOLVENTS
For Polyurethane Coatings

Two solvents, Cellosolve acetate 99 per cent (polyurethane grade) and ethyl acetate 99.5 per cent (polyurethane grade) available for use in urethane resin surface coatings.

Low water, acid and alcohol content of these solvents said to insure stable resin solutions with minimum loss of isocyanate during storage.

Union Carbide Chemicals Co., Division of Union Carbide Corp., Dept. PVP, 30 E. 42nd St., New York 17, N. Y.

AUTOCLAVE
Low-Pressure

Small, low-pressure autoclave for laboratory use.

Designed to give one gallon capacity for operation to 350°C. Two models—one for pressure to 600 p.s.i., the other for pressure to 1200 p.s.i.—available.

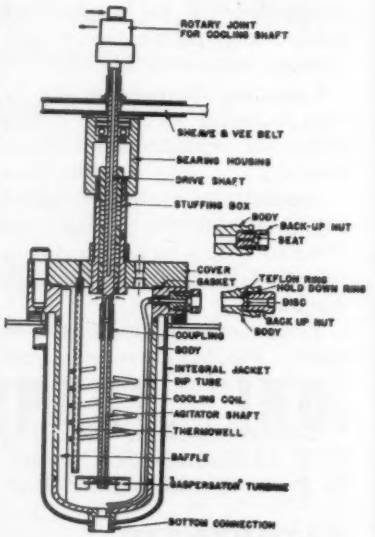
Agitation supplied by a flat blade turbine or by propeller.

Packing and shaft guaranteed for minimum of 500 hours operation. Cover and stuffing box are separable. Closure design of flat bolted type with fully confined gasket.

Openings through body flange rather than cover.

Standard units of 316 stainless steel. Rupture assemblies and thermowell are standard equipment.

Pressure Products Industries, Inc., Dept. PVP, Hatboro, Pa.



PRESSURE PRODUCTS

EXTINGUISHER
Pressurized Dry Chemical

Dry chemical powder has been combined with fast action of pressurized squeeze-lever construction in two new sturdily-constructed,

Surfex® solves sealing and leveling problems in semi-gloss enamels

DIAMOND Surfex controls penetration in semi-gloss formulations. You get uniform application properties and positive self-sealing of surfaces that have varying porosity.

The low binder demand of this surface-coated precipitated calcium carbonate produces, in semi-gloss enamels, flow, gloss and leveling properties usually found in formulas of higher vehicle solids. Surfex improves washability and lessens the danger of ghosting.

DIAMOND production methods closely control particle size (1 to 5 microns), color and texture. As a result, Surfex gives you paint properties not generally attributed to calcium carbonate.

If you would like technical data and suggested formulations, write DIAMOND ALKALI COMPANY, 300 Union Commerce Building, Cleveland 14, Ohio.

Diamond Chemicals

Self-Sealing Semi-Gloss Enamel

Pounds		Gallons
210.00	Rutile Pure Titanium Dioxide	6.00
140.00	Surfex	6.33
2.00	Aluminum Stearate	.20
482.00	Alkyd Resin—40% Solids by Weight	65.80
138.00	Low Odor Mineral Spirits	20.90
2.00	6% Cobalt Naphthenate	.24
4.00	24% Lead Naphthenate	.41
1.00	Anti-Skinning Agent	.12
979.00		100.00

Initial Viscosity—85 KU
Overnight Viscosity—88 KU

high-capacity extinguishers.

Models, containing 20 and 30 pounds of non-toxic and non-freezing powder.

FYR-FYTER

Fanning out in a 60° arc from discharge nozzle, powder travels 15 to 20 feet to the fire source. It absorbs heat, and turns into a fire-killing gas.

Operating pressure of 150 p.s.i. can be maintained for long periods.

Fyr-Fyter Co, Dept. PVP, 221 Crane St., Dayton 3, Ohio.

AIR-POWERED HOIST
Roller or Link Chain

Master Power #105 series hoists with lifting capacities of 1000 and 2000 lbs.

Available with either manual up and down control or pendent control. Weighs only 27 lbs. and the rate of lift is 46 ft. per minute, with 1000 lbs. at 90 p.s.i.

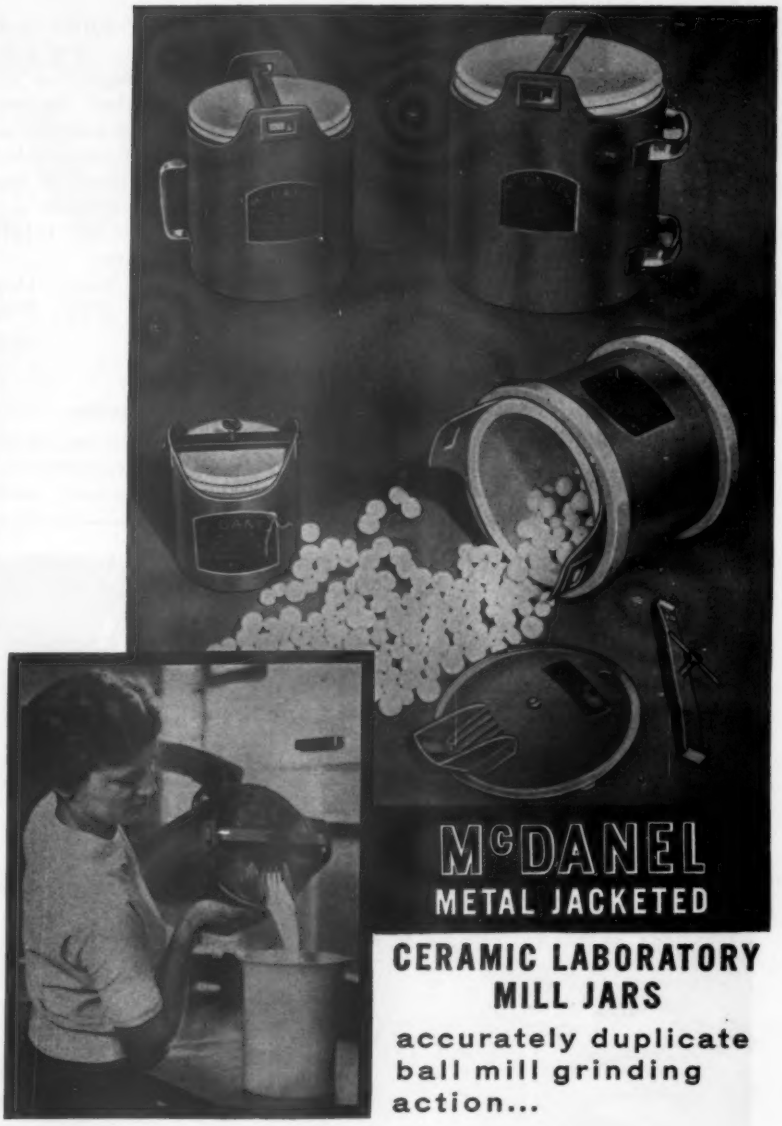
Seven spring-loaded blades claimed to give excellent feathering control of lifting or lowering loads.

Has built-in oil resevoir, oil regulator and filter unit, and inlet is swiveled to eliminate strain on air connections.

Master Pneumatic Tool Co., Inc., Dept. PVP, Bedford, Ohio.

ALUMINUM COMPOUND
For Gelling Alkyds

Phelate 77, a reagent useful in cross-linking polymers containing hydroxyl groups, said to be an



CERAMIC LABORATORY MILL JARS
accurately duplicate ball mill grinding action...

One-quart, one-gallon and two-gallon sizes. Made with sturdy metal handles for cradle-type mills—non-slip rubber tires for roller-type mills. Easy to handle—easy to clean. Metal shell protects jar. Longer jar life as metal jacket allows lining to be completely used without danger of breakage. All-metal discharge cover (extra) retains ball charge. Ground fit cover tightens by hand. Rubber gasket prevents leakage. Neoprene available for oil base grinding. Furnished with ball charge. All parts replaceable.

Write for more information today!
Ask for Bulletin B1-56!

McDANEL Industrial CERAMICS

McDANEL
REFRACTORY PORCELAIN COMPANY
BEAVER FALLS - PENNSYLVANIA

easily handled, non-toxic liquid. Can also be supplied without solvent, if required.

Particularly useful in producing gelled alkyd vehicles which contribute thixotropic structure to coating compositions. Gels formed are smooth, uniform, and free from seed.

J. W. Ayers & Co., Dept. PVP, 640 North Thirteenth St., Easton, Pa.

CELLULOSE GUMS
Water-Soluble

Methocel 60HG, Methocel 70-HG and Methocel 90HG now available.

Products feature improved organic solubility, higher thermogelation characteristics and special emulsion stabilization properties.

Available in wide range of viscosities. Are nonionic, inert and equivalent to Methocel MC U.S.P. grade in chemical purity.

Organic Chemical Sales, Dow Chemical Co., Dept. PVP, Midland, Mich.

ELECTRIC MOTOR
Single-Voltage Submersible

Submersible a-c. electric motor for direct coupling to pumps which must operate continuously while

RELIANCE

submerged in oil, water or liquid chemicals.

The polyphase, single-voltage motor available in sizes from ¾ through 15 horsepower.

Special universal mounting flange designed for direct connection to most standards pumps and modifications can be made.

Rated at 55°C. temperature rise for 30-minute duty in 40°C. air, and for continuous duty in 40°C. liquid, pressure-proof motor is oil-filled to give top performance when immersed at any depth.

Reliance Electric & Engineering Co., Dept. PVP, 24701 Euclid Ave., Cleveland 17, Ohio.

TANK LEVEL DETECTOR
For Process Industries

AccuRay tank level detector-controller now available for the process industries.

Technological advances claimed to have lowered cost to that of conventional float-level controllers.

Said that no part of instrument extends into tank or vessel. Installed completely external to the tank making it free from fouling by process material and readily accessible for maintenance.

Used in either of two modes of operation. Can be installed so as to provide a relay closure signal when level rises above or falls below level of detector, and can be installed so that both a high and low level can be provided from one instrument. Accuracies available up to ± 1/16".

Radiation field required at detectors is low—only 0.2 mr/hr. Unique circuitry said to prevent chatter from radiation statistics.

Industrial Nucleonics Corp., Dept. PVP, 1205 Chesapeake Ave., Columbus 12, Ohio.

How to select, apply and disperse the 11 members of the Syloid family

New 12-page booklet tells what specific industrial applications each Syloid answers—and why!

What are the Syloids? What are their important typical chemical-physical characteristics? What are their individual properties? What Syloids should be used to create a flat finish? . . . in anti-blocking? . . . to thicken a liquid? . . . to remove moisture? . . . in adhesive formulations? . . . for insulation? What mixing techniques should be used for Syloid in a liquid, in a dry powder?

You'll find the answers to these and other questions in the just-off-the-press booklet, "The Davison Family of SYLOID SILICAS." We're sure you'll find it of great assistance in your everyday work. For your copy, just write to us on company letterhead.

DAVISON
CHEMICAL COMPANY
Division of W. R. Grace & Co.
Baltimore 3, Maryland

Eastman SOLVENTS

2-ethylhexyl alcohol
2-ethylisohexyl alcohol
Tecsol®
proprietary ethyl alcohol
95% and anhydrous
isobutyl acetate
n-butyl acetate
ethyl acetate
isobutyl alcohol
isopropyl acetate
2-ethylisohexyl acetate
acetone

Most Eastman solvents are stored in bulk in the major industrial centers of the United States. Write for information or call your Eastman representative.

Eastman
CHEMICAL PRODUCTS, INC.
KINGSPORT, TENNESSEE
subsidiary of EASTMAN KODAK COMPANY

SALES OFFICES: Eastman Chemical Products, Inc., Kingsport, Tennessee; New York City; Framingham, Mass.; Cincinnati; Cleveland; Chicago; St. Louis; Houston. West Coast: Wilson Meyer Co., San Francisco; Los Angeles; Portland; Salt Lake City; Seattle.

TALL OIL TALK FROM Arizona

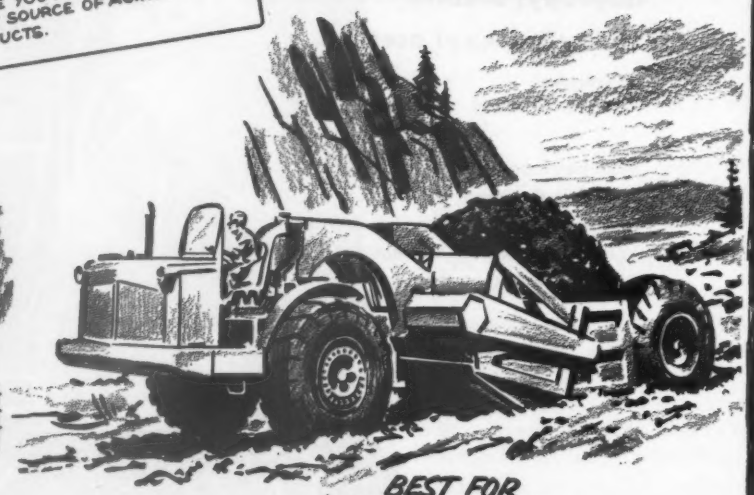
CHEMICAL COMPANY
World's largest producer of products based on Tall Oil

WE'VE NEVER MADE A TREE

BUT FROM PULP TO BLACK LIQUOR SOAP TO FRACTIONATING, THE JOINT INTERESTS OF INTERNATIONAL PAPER COMPANY AND AMERICAN CYANAMID COMPANY PROVIDE THE SUPPLY AND CHEMICAL KNOW-HOW TO ASSURE YOU A RELIABLE, CONSTANT SOURCE OF ACINTOL® TALL OIL PRODUCTS.

SPARKLE PLENTY!

WHITES STAY WHITER WHEN SHORT-AND MEDIUM-OIL ALKYD BAKING ENAMELS ARE COMPOUNDED WITH ACINTOL® FA-2 FATTY ACID.



BEST FOR THE LONG HAUL

EARTH MOVERS PROTECTED WITH PAINTS BASED ON ACINTOL FATTY ACID ALKYDS STAND UP WELL IN NOON-DAY SUN, RAIN OR WEATHER. ACINTOL-BASED IMPLEMENT ENAMELS (FOR MACHINES, TRACTORS, ETC.) ARE MORE ECONOMICAL, AMAZINGLY DURABLE.

NO HEX ON THIS BARN PAINT

THE AMISH PEOPLE OF PENNSYLVANIA PAINT GOOD LUCK SYMBOLS ON BARNS TO GUARD AGAINST ILL FORTUNE. PAINTMAKERS RELY ON ACINTOL D AS THE MONEY SAVING COMPONENT THAT PUTS SEASONS OF PROTECTION IN BARN PAINTS USED EVERYWHERE.

WIN A DRUM OF OIL—It's easy . . . just send us your idea for a new use of Tall Oil Products. If it's used in one of our ads, you will be the proud owner of a drum of ACINTOL®—or its equivalent in cash. Win, lose or draw—you get a prize for entering. So do it NOW. Send your Tall Oil Tale to:

Arizona Chemical Company
(INCORPORATED)
30 Rockefeller Plaza, New York 20, N. Y.

*Reg. U. S. Patent Office

ACINTOL D and ACINTOL DLR Special Distilled Tall Oil · ACINTOL FA-1 and FA-2 Fatty Acids · ACINTOL P Tall Oil Pitch · ACINTENE® Terpenes

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PATENTS

Complete copies of any patents or trade-mark registration reported below may be obtained by sending 50c for each copy desired (to foreign countries $1.00 per copy) to the publisher.

Wood Finishing Composition

U. S. Patent 2,829,067. Jack Eastland, Atlanta, Ga., assignor to Eastland and Sapp, Atlanta, Ga., a partnership.

The process of finishing wood surfaces, the step which comprises applying to said surface a composition comprising an aqueous emulsion of a methyl methacrylate resin containing about 35% by weight of resin and from 0.2 to 2.85% by weight of borax, and thereafter drying.

The process of above claim in which a substantially transparent finish coating is subsequently applied to the dried methylmethacrylate coating.

Fluorescent Pigments

U. S. Patent 2,831,816. Joseph L. Switzer, Cleveland Heights, and Robert C. Switzer, South Euclid, Ohio, and Richard A. Ward, Newark, N. J., assignors, by direct and mesne assignments, to John D. Steele, Cleveland, Ohio.

The method of making a fluorescent paramagnetic compound comprising the steps of precipitating a fluorescent component of the group consisting of the zinc, calcium, cadmium, beryllium, and magnesium inner complex salts of phenols of the group consisting of 8-hydroxyquinoline and derivatives thereof upon a solid paramagnetic substrata.

Synthetic Drying Oils

U. S. Patent 2,829,065. Anthony H. Gleason and Joseph F. Nelson, Westfield, N. J., assignors to Esso Research and Engineering Co., a corporation of Delaware.

A new composition of matter comprising a siccative copolymer of about 60 to 95 parts of a combined conjugated diolefin and about 40 to 5 parts of combined myrcene, said copolymer having a viscosity of about 0.15 to 10 poises at 50% N. V. M. in a hydrocarbon solvent.

A polymerization process which comprises mixing 60 to 95 parts of a conjugated diolefin and 40 to 5 parts of myrcene, 50 to 500 parts of an inert hydrocarbon diluent boiling between—15°C and 250°C., 10 to 50 parts of a promoter selected from the group consisting of open-chain ethers having 4 to 8 carbon atoms and cyclic di-ethers having 4 to 8 carbon atoms wherein the two oxygen atoms are separated by at least two carbon atoms, and 1.0 to 5 parts of a finely divided alkali metal, and maintaining the resulting mixture at a temperature between 25 and 105°C. until substantially 100% conversion is obtained.

Wood Filler and Glazier Putty

U. S. Patent 2,831,776. Gustave J. Soderberg, Babylon, N. Y.

A combined wood filler and glazier putty, consisting essentially of a cold mixture of from 20 to 40 parts of gypsum plaster, 5 to 10 parts wood flour, from 5 to 10 parts rosin, and from 5 to 10 parts linseed oil, 20 to 25 parts shellac and 1 to 3 parts alcohol.

Silicone Oils

U. S. Patent 2,831,008. Herbert Knopf and Alexander Beerwald, Leverkusen-Bayerwerk, and Georg Brinkman, Leverkusen, Germany, assignors to Farbenfabriken Bayer Aktiengesellschaft, Leverkusen, Germany, a corporation of Germany.

A process for the manufacture of stable siloxanes by reaction of a member of the group consisting of cyclic siloxanes, siloxanes containing silanol groups and mixtures of these siloxanes with compounds containing monofunctional silyl groups, which comprises carrying out the reaction in the presence of a solid cation exchanger which prior to use has been treated with acids and washed until neutral reaction is obtained.

Tung Oil Varnish Resins

U. S. Patent 2,829,064. Lucien L. Hopper, Jr., New Orleans, La., assignor to the U. S. of America as represented by the Secretary of Agriculture.

A process of preparing a gas-proof, non-gelling tung oil varnish resin having a rapid oxidative air drying rate comprising heat bodying a mixture con-

ROMMEL, ALLWINE & ROMMEL

REGISTERED PATENT ATTORNEYS

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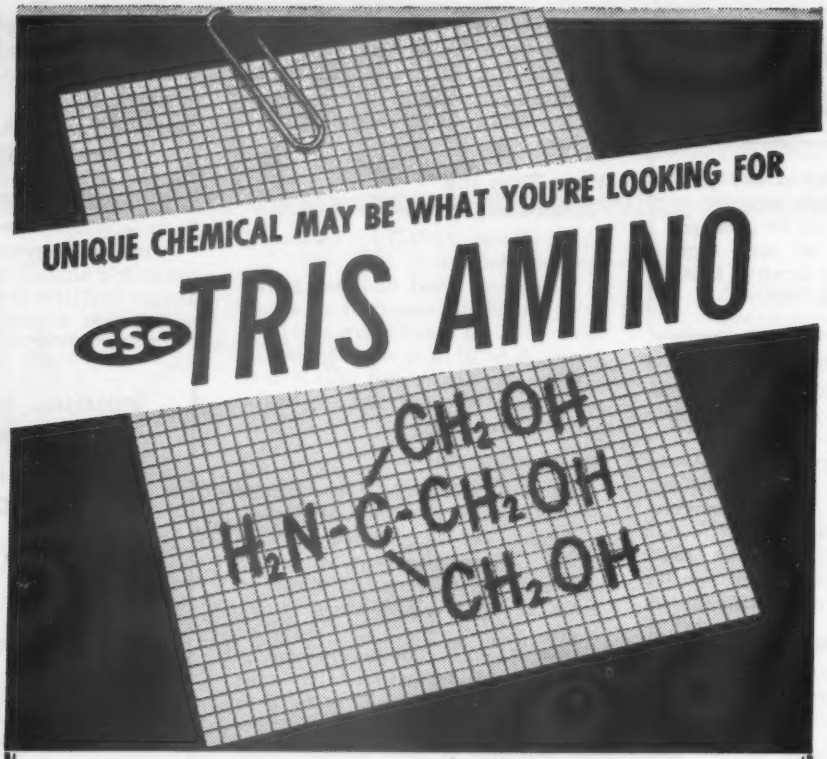
Suite 424, 815 — 15th St., N. W.
Washington 5, D. C.

Patent Practice before U. S. Patent Office. Validity and Infringements Investigations and Opinions.

high quality...
Picco Hisolvs
Uniformity and high quality make Picco Hisolv Naphthas an excellent source of supply where mixed petroleum aromatic solvents are indicated. Write for brochure.
PENNSYLVANIA INDUSTRIAL CHEMICAL CORPORATION
Clairton, Penna.
PICCO



Tris(hydroxymethyl)aminomethane. Unique! The only tri-hydroxy molecule commercially available having a primary amine group. This highly reactive nitroparaffin derivative has great potential in chemical synthesis. In manufacture of resins, drying oils, surface-active agents. In preparation of cosmetic creams, textile specialties, cleaning compounds, etc. Evaluate Tris Amino. Write for Samples and Technical Data.

PROPERTIES

Molecular Weight	121.14
Boiling Point, °C	219 to 220 at 10mm
Melting Point, °C	171 to 172
pH of 0.1M Aqueous Solution at 20°C	10.4
Solubility in Water at 20°C, g/100 ml	80

CSC CHEMICALS FOR INDUSTRY

ALCOHOLS
Methanol Butanol
Ethyl Alcohol

AMINES AND AMMONIA
Ammonia, Anhydrous and Aqua
Ammonium Nitrate, Solid and 83% Sol.
Methylamines
Benzyltrimethylammonium Chloride
Hydroxyethyltrimethylammonium-bicarbonate

ESTERS
Amyl Acetate Butyl Acetate
Butyl Lactate Butyl Stearate
Dibutyl Phthalate Ethyl Acetate
Tributyl Phosphate

NITROPARAFFINS
Nitroethane 2-Nitropropane
Nitromethane 1-Nitropropane
Alkaterges Diamines
Aminohydroxy Compounds
Nitrohydroxy Compounds
Chloronitroparaffins

PHARMACEUTICALS, BULK
Bacitracin Cycloserine
Riboflavin, U.S.P. and U.S.P., R.S.

OTHER CHEMICALS
Acetone Formaldehyde
Pentaerythritol

COMMERCIAL SOLVENTS CORPORATION
260 Madison Avenue, New York 16, New York

ATLANTA, GA. • BOSTON, MASS. • CHICAGO, ILL. • CINCINNATI, OHIO • CLEVELAND, OHIO DETROIT, MICH. • HOUSTON, TEXAS • INDIANAPOLIS, IND. • KANSAS CITY, MO. • LOS ANGELES, CALIF. • LOUISVILLE, KY. • MEMPHIS, TENN. • MILWAUKEE, WISC. • MINNEAPOLIS, MINN. NEWARK, N. J. • NEW ORLEANS, LA. • PHILADELPHIA, PA. • PITTSBURGH, PA. • PORTLAND, ORE. ST. LOUIS, MO. • ST. PAUL, MINN. • SAN FRANCISCO, CALIF. • STERLINGTON, LA. • IN MEXICO: COMSOLMEX, S.A., MEXICO 7, D.F. • IN CANADA: McARTHUR CHEMICAL CO., MONTREAL, QUE.

taining a drying oil having at least about 50% by weight of tung oil and a zinc rosinate having incorporated therein about from 1 to 5 parts by weight of a varnish solvent soluble resinous rosin-polyhydric alcohol reaction product selected from the group consisting of the reaction products of rosin and glycerol, the reaction product of rosin and pentaerythritol, and the reaction products of rosin, pentaerythritol, and maleic anhydride, at a temperature of at least about 550°F.

Polytetrafluoroethylene Coating

U. S. Patent 2,825,664. James Robert Huntsberger, Wynnewood, Pa., assignor to E. I. du Pont de Nemours and Co., Wilmington, Del., a corporation of Delaware.

An aqueous coating composition comprising water, colloidal polytetrafluoroethylene, and 10%-85% by weight based on the polytetrafluoroethylene of water-soluble alkali metal silicate together with colloidal silica, the ratio of said silicate to said silca being between 25:75 and 90:10 by weight.

Stabilized Paraffin Wax

U. S. Patent 2,827,387. Charles F. Duchacek, L.I.C., N.Y., assignor to Socony Mobil Oil Co., Inc., a corporation of New York.

A paraffin wax product consisting of refined, colorless, odorless paraffin wax stabilized against oxidation by the addition thereto of from about 0.001 wt. percent to about 0.05 wt. percent of a mixture of a polyalkyl siloxane of 50-1000 centistokes viscosity at 100° F. and from 1.0 wt. percent to 10.0 wt. percent, based on the siloxane, of a finely divided silica aerogel dispersant.

•

Can Plant Opens

The National Can Corp. has announced the appointment of S. H. Grace as acting manager of its new Marion, Ohio plant.

The plant has just completed installation and testing of its three basic production lines, and has commenced production of cans for sale. It is capable of producing more than 1.25 million cans per day.

•

Epoxy Resin Production

Reichhold Chemicals, Inc. has begun production of epoxy resins at its plant in Ballardvale, Mass.

The plant is expected to produce 10 million lbs. of both liquid and solid epoxy resins annually, which will be marketed under the trade name of Epotuf epoxy resins.

Philadelphia Club Talk

Kenneth C. Smith was the guest speaker at the Philadelphia Paint & Varnish Production Club's April meeting.

Mr. Smith, elastomers laboratory of E. I. du Pont de Nemours & Co., spoke on "Hypalon—A New Binder for Use in Paints."

He discussed the chemistry and manufacture of Hypalon. He pointed out that Hypalon films have a number of attractive properties but also indicated several disadvantages.

The advantages and disadvantages of the product obtained with various curing agents were also covered as were the problems involved in the pigmentation of paints made from Hypalon.

•

Representative Named

The Freeman Chemical Corp. of Port Washington, Wisc., has announced the appointment of Arthur E. Fitzgerald as its Chicago representative.

The firm manufacturers vehicles for the coating and polyurethane industries.

•

Change of Address

The executive and sales offices and service laboratories of Sindar Corp. have been moved to 321 West 44th St., New York 36, N. Y., it has been announced.

STILL UNSURPASSED...
In Color and Sheen Uniformity!

Across the nation an ever-increasing number of paint manufacturers are discovering the unique properties of paints based on FAFL.

Wherever flat paints must stand up to a demanding challenge—the utmost in color uniformity—sheen uniformity—color retention—washability—easy application—durability and long pleasing appearance—for interior or exterior surfaces—paints based on FAFL are providing unsurpassed performance.

Increase your alkyd flat paint sales with FAFL

FAFL-OD for Odorless Paints is a great sales-getter. Used also for government specification paints.
Write for samples and complete information.

SPECIFICATIONS

VISCOSITY	V-Y
NON-VOLATILE	30% ± 1%
COLOR	6 Maximum
ACID NO.	10 Maximum (on solids)
WEIGHT per gal.	7.3 lbs.
TYPE	Pure drying oil alkyd

FARNOW
Varnishes INC. Alkyds
4-83 - 48th Avenue
Long Island City 1, N. Y.

Manufacturers of:
ALKYDS — SPECIFICATION LIQUIDS — SPAR VARNISHES — SYNTHETIC VARNISHES — GLOSS OILS — ESTER GUMS — SOLUTION — PROCESSED OILS — RESIN SOLUTIONS — DRIERS — GRINDING LIQUIDS — MARINE FINISHES — ARCHITECTURAL VEHICLES — INDUSTRIAL VEHICLES

PROGRESS

...means new profit opportunities for your paints with "Ti-Pure" titanium dioxide chloride process pigments

Du Pont "Ti-Pure" titanium dioxide *chloride* process pigments help you cut manufacturing costs...increase your profit opportunities. These pigments offer excellent color and gloss retention, low binder demand and greater mill base loading.

• For information on the use and advantages of "Ti-Pure" R-100 and R-500 chloride pigments in your paints, call your nearest Du Pont District Office, or write: E. I. du Pont de Nemours & Co. (Inc.), Pigments Department, Wilmington 98, Delaware. In Canada: Du Pont Company of Canada (1956) Limited, P. O. Box 660, Montreal, Quebec.

PROGRESS IN PIGMENTS

IN PIGMENTS

Pigments are basic—and every improvement in their properties or use can mean better, more profitable paints for you. To Du Pont, a supplier of pigments to your industry, this is a compelling reason to maintain a program of progress in our products and service.

An important part of Du Pont's dynamic continuing program is the spirit of progress—a sensitivity to your needs and the opportunities for advancing the interests of the paint industry.

This is Du Pont Progress in Pigments—the assurance of new and improved pigments, both today and tomorrow... and the growing technical skills and resources with which to serve you.

PIGMENTS DEPARTMENT

DU PONT

REG. U.S. PAT. OFF.

BETTER THINGS FOR BETTER LIVING
... THROUGH CHEMISTRY

...FROM DU PONT

TO BE SURE... WE PRACTICE WHAT WE PREACH!

The photos above show painters applying "9200"-base primer, enamel top coat and blue aluminum paints to giant new Woodmar installation at Washington, West Virginia.

MARBON "9200"

Soluble High Styrene Resins

USED ON OUR MULTI-MILLION DOLLAR WOODMAR INSTALLATION

For unexcelled protection against the severe effects of weather and climate on tubing, piping, storage tanks and general outdoor installations, Marbon Chemical specified primer, enamel top coat and aluminum paints made with "9200" resins for the gigantic new Woodmar installation. In addition to having high corrosion resistance, these resins provide superior brush-on qualities, better coverage and easily controlled dry rate. They also supply desirable high gloss and film build.

For higher paint production . . . for greater package stability . . . use Marbon "9200"! Designed for simple cold-cut, stir-in manufacturing . . . in everything from clear lacquers to semi-flats—all at lower prices!

MARBON 9200 HV
for lower vehicle solids at higher viscosity

MARBON 9200 MV & LV
for general use

MARBON 9200 LLV
for higher vehicle solids at lower viscosity

MARBON 11953 RESIN
for low odor, low cost finishes

Get the facts . . . WRITE TODAY FOR TECHNICAL LITERATURE

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Marbon CHEMICAL
SYNTHETIC RESINS

Division of BORG WARNER • Gary, Indiana

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WEST COAST: Harwick Standard Chemical Co., Los Angeles, Cal.
CANADA: Dillons Chemical Co. Ltd., Montreal & Toronto
EXPORT: British Anchor Chemical Corp., New York

PERSONNEL CHANGES

REICHHOLD

Sidney Lauren has been appointed manager of technical service for surface coating emulsions at the Elizabeth, N. J. plant, it has been announced.

S. Lauren

Mr. Lauren is an adjunct professor of chemical engineering in the graduate school of the Polytechnic Institute of Brooklyn.

Before joining the firm, Mr. Lauren was senior research chemist in the finishes and adhesives section of the Johns-Manville Research Center, Manville, N. J.

Herbert W. Mason, Jr. has returned as administrative vice president following a one-year's leave of absence, it has also been announced.

Mr. Mason has been with the firm since 1936. He was made vice president in charge of purchasing ten years ago, after organizing the purchasing department.

NUODEX PRODUCTS

Harvey Lieberman has been appointed manager of technical service and **Raymond J. Schraff** has been named manager of the organic peroxide catalyst Division's Cleveland office.

Mr. Lieberman will supervise the peroxide application laboratory.

Formerly with Resin Research Laboratories, Inc., Mr. Lieberman has had extensive experience in polymer research and development.

He holds an M.S. degree from the Polytechnic Institute of Brooklyn.

As branch manager, Mr. Schraff will service a territory covering Ohio, Michigan, Indiana, western Pennsylvania and New York.

He was formerly a district representative and agent for the Ceilcote Co.

In 1943, Mr. Schraff received a B.S. degree in chemistry from St. Joseph's College.

DU PONT

W. Samuel Carpenter, III, director of sales of the petroleum chemicals division, has become assistant general manager of the electrochemicals department, it has been announced.

He succeeds **Charles B. McCoy** who has been named general manager of the elastomer chemicals department.

Mr. Carpenter has been with the company for more than 20 years. After spending some time in the rayon division, Mr. Carpenter was transferred to the petroleum chemicals division and in 1957, became director of sales for that division.

He received a B.S. degree in chemical engineering from Princeton University in 1951.

GENERAL MILLS

David S. Chatterton has joined the chemical engineering staff, it has been announced.

Mr. Chatterton has recently completed his studies for a Master's degree in chemical engineering at the University of Minnesota.

He has been associated with the firm as a summer employee since 1952.

ROHM & HAAS

John F. Bergin has been elected a vice president of the company, it has been announced.

J. F. Bergin

Mr. Bergin has been head of the firm's patent department for many years and was elected an assistant secretary in 1948.

He is also assistant secretary of the Southern Resin & Chemical Co., a wholly owned subsidiary.

Mr. Bergin received a B.S. degree in chemical engineering from Catholic University and an LL.B. from Georgetown.

For a complete line of paint additives...

LOOK TO NOPCO

Although they are but a small part of the finished product, paint additives are a very necessary and important part. And the manufacturer who looks to Nopco for his supplies wins more ways than one. Because Nopco manufactures a complete line of paint specialties, you can place a single order to cover all your needs and qualify for quantity price discounts. Because Nopco plants are strategically located, you can count on fast delivery and save on freight as well. And because of the years of experience behind the Nopco line, you can be sure of competent technical services.

Write for a booklet fully describing the Nopco line. Nopco Chemical Company, Harrison, N.J., or Richmond, Calif.

NOPCO PAINT SPECIALTIES INCLUDE

- Anti-Foaming Agents
- Pigment Dispersing Agents
- Freeze-Thaw Stabilizers
- Thickeners
- Viscosity Stabilizers
- Surface Active Agents
- Stearates

NOPCO **VITAL INGREDIENTS FOR VITAL INDUSTRIES**

PLANTS: Harrison, N.J. • Cedartown, Ga. • Richmond, Calif. • London, Canada

The lighter side of paint . . . where pigmentation is involved . . . calls for TITANOX* titanium dioxide white pigments—first choice among paint makers.

For TITANOX white pigments are adaptable to any type of coating, from delicate trade sales color systems to durable industrial product finishes. Unsurpassed in whitening, brightening and hiding power, plus ease of dispersion, TITANOX pigments lighten not only your paints but the burden of paint processing as well. Our Technical Service Department can help you with any white pigmentation problem. Titanium Pigment Corporation, 111 Broadway, New York 6, N. Y.; offices and warehouses in principal cities.

5727

TITANIUM PIGMENT CORPORATION

Subsidiary of NATIONAL LEAD COMPANY

*TITANOX is a registered trademark for the full line of titanium pigments offered by Titanium Pigment Corporation.

PATTERSON FOUNDRY

Elmer W. Dany, vice president of Ferro Corp., has been named executive vice president of the firm, a Ferro subsidiary.

E. W. Dany

Mr. Dany, a 31-year veteran of Ferro, will continue his present duties while assuming his new responsibilities.

He is a graduate mechanical engineer of the University of Alabama. He holds numerous patents in the porcelain enamel field and is a recognized authority on porcelain enameling furnaces.

PITTSBURGH COKE

Donald L. McCuen has joined the industrial chemicals division as a sales representative, it has been announced.

Mr. McCuen will be responsible for industrial chemical sales in the Philadelphia territory. He succeeds **Walter H. Daub,** who returns to Pittsburgh on an assignment to the product development section of the industrial chemicals division.

Prior to joining the firm, Mr. McCuen had been associated with the polymer chemicals division of W. R. Grace & Co. and had been president of his own manufacturing firm.

He is a 1951 graduate of Princeton University, receiving his degree in chemical engineering.

STONER-MUDGE

George W. Seagren, a leading authority on corrosion and corrosion prevention, has been named director of research, it has been anounced.

Mr. Seagren was formerly head of a multiple fellowship sponsored by the firm at the Mellon Institute of Industrial Research.

He is a graduate of Pennsylvania State University and is a member of many technical societies.

R. J. BROWN

Eugene T. Allen has been appointed plant manager of the solvents Division, Memphis, Tenn.

E. T. Allen

Mr. Allen has been with the firm in St. Louis for the past few years.

In other personnel changes, **Jack L. McBride** has been named a salesman for the petroleum solvents division in Chicago, and **John J. Lynch** has also joined the sales force and will work out of Detroit.

PICCO

William K. Hipp has joined the New Orleans district office, it has been announced. He will work out of the firm's Houston, Texas sales residency.

Mr. Hipp is a graduate of the Citadel. He was formerly associated with Dan River Mills, Inc.

CROWN CORK & SEAL

Clyde F. Aleck has been named northern district sales manager, it has been announced.

Mr. Aleck will be responsible for sales of cans, closures and machinery in the northwest area, Alaska and Hawaii.

Mr. Aleck has been associated with the company since 1944.

HEYDEN NEWPORT

Dr. Herman Sokol has been named executive vice president, it has been announced.

H. Sokol

Dr. Sokol has been vice president in charge of all company research and development since 1954.

He joined the firm as a research chemist after receiving his doctorate in organic chemistry from New York University in 1943.

While manager of the antibiotics division, Dr. Sokol helped in the discovery and development of tetracycline.

STOP
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Now—a greater stability in exterior finishes!
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Regal Yellows
IMPERIAL PAPER & COLOR CORP.
Pigment Color Division
REGAL YELLOWS, although less clean initially than conventional Chrome Yellows, show considerably less change on exposure. The result is REGAL YELLOWS show up cleaner and brighter after exterior exposure. REGAL YELLOWS are useful for exterior paints and enamels used on school buses, taxicabs, trucks, farm equipment, etc. where resistance to darkening on exposure is important.
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PORTLAND • SEATTLE • TORONTO, ONT. • ST. JOHNS, QUE

H. KOHNSTAMM

Dr. Samuel Zuckerman has been named a vice president, and **Dr. Robert Cooney** has been appointed assistant vice president, it has been

R. Cooney

S. Zuckerman

announced.

Dr. Zuckerman joined the firm in 1936 as a chemist. He became technical director of the organic color division in 1950 and plant superintendent four years later.

Dr. Cooney has been with the company for the past 24 years. He became an organic research group leader in 1943 and a research supervisor in 1950.

Both gentlemen received their M.S. and Ph.D. degrees from Brooklyn Polytechnic Institute.

BARRETT

Dr. Maurice H. Bigelow has been appointed vice president of the firm, a division of Allied Chemical Corp.

Formerly technical director, Dr. Bigelow will continue to be head of the research and development department.

He is a graduate of Northwestern University and the University of Pittsburgh.

Stanley C. Gerrard has been appointed assistant director of industrial relations, it has also been announced.

Mr. Gerrard has been with the firm since 1937. He is a graduate of New York University.

CYANAMID

Edward W. Galloway has been appointed sales manager for the pigments division, it has been announced.

E. W. Galloway

In his new position, he will be located at company headquarters in New York City.

Mr. Galloway has been with the firm since 1947 when he joined the Piney River, Va. plant as a research chemist.

He has since served the company in numerous sales and managerial posts.

ARIZONA CHEMICAL

J. H. Ruskin has been elected president and director, it has been announced.

J. H. Ruskin

Mr. Ruskin has been serving as general manager of Cyanamid's fine chemicals division. He joined the company's legal department in 1947 and was named an assistant secretary two years later.

He received an A.B. degree from Harvard University and an LL.B. degree from the Yale School of Law.

UNION CARBIDE CHEMICALS

Richard W. Eddy has been promoted to manager of the new chemicals division, it has been announced. He has been assistant manager of this department since 1955.

Mr. Eddy joined the organization as a chemist at the S. Charleston, W. Va. research laboratories following graduation from Ohio University in 1940.

He also holds an M.S. degree in organic chemistry from the Massachusetts Institute of Technology.

SINCLAIR CHEMICALS

Van J. Olsen has been appointed midwest sales representative, it has been announced.

V. J. Olsen

Prior to joining the firm, a subsidiary of Sinclair Oil Corp., Mr. Olsen had been associated with the Sinclair Refining Co. as an industrial salesman and was later promoted to national accounts representative for the Great Lakes division.

Mr. Olsen received his B.S. degree from Western Michigan University

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Oils and Fatty Acids
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THE SOLVENTS AND CHEMICALS GROUP

L. SONNEBORN SONS

Dr. Ira Kukin has been named research director at the Belleville, N. J. plant, it has been announced.

In his new capacity, Dr. Kukin will be in charge of research and development of petroleum and textile products.

Dr. Kukin joined the firm in 1957 as liaison chemist after 6 years with the Gulf Oil Co. where he was a group leader.

He received his Ph.D. degree from Harvard University in 1951.

Irving P. Schwerd has been appointed chief engineer of the Belleville, N. J. plant, it has also been announced.

Mr. Schwerd comes to the firm from Otto B. May, Inc. where he served as plant engineer for the past four years. He had been previously associated with E. I. du Pont de Nemours & Co.

Mr. Schwerd was graduated in 1950 from C.C.N.Y. with a degree of bachelor of chemical engineering.

N. J. ZINC

William E. Pepper has become associated with the technical service staff, it has been announced.

He will concern himself with the application of the firm's zinc oxide and titanium dioxide pigments in the paint industry. His headquarters will be in New York.

Mr. Pepper was formerly affiliated with the Tropical Paint Co. and the Sherwin-Williams Co.

He is a graduate of Case Institute in Cleveland.

VULCAN

Herbert F. Fagot has been appointed to the Chicago sales staff, it has been announced.

Mr. Fagot will sell the firm's full line of steel containers for such basic users as chemicals, paints and adhesives industries.

Mr. Fagot is a graduate of Bradley University.

DE LAVAL SEPARATOR

Wencel A. Neumann, Jr. was elected president of the firm, it has been announced.

Also, he was elected president of the company's west coast subsidiary, De Laval Pacific Co.

C. B. Schmidt, whom Mr. Neumann succeeded, has been named vice chairman of the board of directors.

Mr. Neumann joined the firm as executive vice president in 1954. He had been previously associated with the Westinghouse Electric Corp. He is a graduate of the University of Michigan and holds a B.S. in engineering.

NEWS

Mountsier Receives N. Y. Club's PaVaC Award

The presentation of the honored PaVaC award was made to S.R. Mountsier, Jr. at the May 1 meeting of the New York Paint & Varnish Production Club.

Mr. Mountsier, manager of the technical service department of Whittaker, Clark & Daniels, Inc., has been for many years an active participant in the technical development of the paint and varnish industry. He has been a member of the club since 1927.

S. R. Mountsier, Jr.

The New York Club has profited by Mr. Mountsier's activity on many committees, including chairmanship of the advisory sub-committee of the technical committee, chairmanship of the golf committee, as well as participation on the historical, joint coordinating, program, by-laws, and executive committees.

He also served as treasurer in 1947 and secretary in 1948.

In addition, he has served on various committees for the Federation of Paint & Varnish Production Clubs.

Mr. Mountsier's influence on the paint industry has been most notable in the development of the color additive system. This method of paint merchandising which was developed from his fund of paint knowledge and imagination has grown from his original tube system to universal colorants and color machines.

The PaVaC award is bestowed on those members of the Club for outstanding contributions to the advancement of the protective coatings industry and the New York Paint & Varnish Production Club.

Harry Burrell, manager of the resin development laboratories, Interchemical Corp., was the guest speaker at the meeting.

He gave a talk on "The Nature of Resin Solutions."

•

Emery N. Y. Office Moves

The New York sales office of Emery Industries, Inc. has moved to new quarters at 1 Exchange Place, Jersey City 2, N. J.

The new office will serve as headquarters for H. D. Armitage, R. J. Roberts and R. C. DeLollis, fatty acid sales representatives, and G. R. Williams and R. S. Haley, organic chemical sales representatives.

•

CORRECTION

In the "Personnel Changes" section of the March 1958 issue, C. A. Coffey's title of assistant vice president was in error.

Mr. Coffey's correct title is vice president, Valspar Corp.

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3

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Knows how to work with and complement all

MANAGEMENT

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PLANTS FROM COAST TO COAST

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CONVENIENCE

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Filtered high solid cuts in a choice of solvent combinations:

571 KX **571 CX**
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LESS STORAGE SPACE

MANY USES

DAVIES 5 Gallon Flaring Pail
features a single, welded seam

LEAKPROOF — Unlike the conventional dope side double seam container, the Davies flaring pail has only *one* seam and it's *welded.* Thus you are assured leakproof protection and greater strength.

LESS STORAGE SPACE — Flaring pails require much less storage space than straight side containers. The tapered design of the new Davies flaring pail permits storing at least three times as many pails in a car or in your factory.

MANY USES — Now widely used as a container for roofing and caulking compounds, the welded construction feature of the Davies flaring pail offers many new applications.

Available plain or lithographed, this pail is only one of many containers produced at Davies' three plants in Cleveland, Conneaut and Massillon, Ohio. Combined they offer you 96 years container experience for safe and sure product protection.

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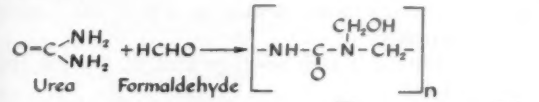
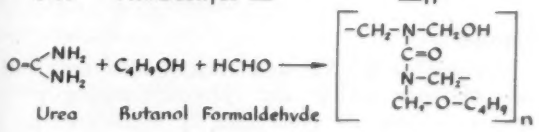
is very good. Formulation is relatively simple because of good stability and because plasticizers are not needed. Although the acrylic emulsions were relatively high in cost originally, the cost has decreased and, accordingly, their use in latex paints has increased.

For solvent-based paints acrylic resins are formulated by fairly conventional techniques. Solvents such as toluene are generally used to obtain lacquer-like finishes which dry rapidly, give water white films with excellent color retention and are highly resistant to chemicals. In addition, the films have excellent gloss retention and good outdoor durability. It is for this reason that acrylic paints are becoming of greater interest to the automobile industry. The virtue of the acrylic finishes for automobiles is said to be increased life of the paint coupled with a minimum of maintenance. According to a recent news release, 1958 model cars will benefit markedly from acrylic finishes. Thus, 65 per cent of Ford cars, 75 per cent of the American Motor Corproation's cars and practically all of the Chrysler Corporation cars will have an acrylic finish. Similarly, about 30 per cent of the General Motors' cars will be coated with acrylic lacquers.

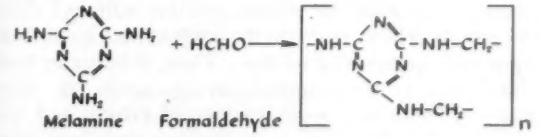
Urea and Melamine Resins

The condensation of urea with formaldehyde, either as such or in the presence of a modifier such as butanol, provides the urea resins as the following equations indicate.





Similarly, when melamine is combined with formaldehyde, the so-called melamine resins result:



The petrochemicals industry contributes here by providing the formaldehyde, the butyl or similar alcohols which may be used, the urea and the ammonia necessary for the melamine resins. These resins find general application in the formulation of baking type finishes for a large number of metal products. In particular, they are of importance in combination with alkyds for appliance finishes. In addition to the oil modified alkyds, the amino resins may be combined with polyvinyl butyrals, with certain types of polyvinyl chloride-acetate copolymers, with alcohol soluble phenolic resins and with epoxy resins. The characteristic of all of these modifying resins is that they have available hydroxyl groups, which are necessary

"Tailored" Odor Treatment Gives You Odor-Free Paint For Less Than 1c More Per Gallon

You can meet the consumer demand for odor-free paints of every type—standard, acrylic, latex-based, polyvinyl acetate or alkyd—at a fraction of a cent per gallon for effective VANDOR odor treatment.

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so that the proper interaction between the amino resins and the modifier can be achieved.

An important point is that the amino resins by themselves are not film formers, but must always be used with another resin, such as the alkyds or the epoxies, with which they combine to form a new type of polymeric substance. Of all the combinations, the alkyd-amino resin combination is the most important and 85 per cent of the amino resins produced today are used with alkyds. The amino resins are desirable for combination with alkyds because they improve the color, color retention, alkali resistance, grease resistance, solvent resistance, hardness and mar resistance of the alkyd. On the minus side of the ledger, there is some loss in flexibility. Also the urea resins tend to decrease durability, but the melamine resins actually improve this property. In general, the melamine resin perform better than the urea resins and are correspondingly more expensive.

One of the important advantages of the urea or melamine resins is that they may be used with non-drying alkyds such as those formulated with coconut oil acids. Alkyds based on saturated acids, as might be expected, have much better color and color retention than the drying oil-modified alkyds. Accordingly, the use of melamines with non-drying alkyds in baking finishes provides coatings with a high degree of color retention. The ratio of amino resin to alkyd is normally 15 to 30 per cent, although it may drop to as low as five to ten per cent in automobile finishes, and may be as high as 35 to 40 per cent in washing machine finishes, and up to 50 per cent in low bake furniture finishes. Furniture, incidentally, is the most important non-metallic surface to which the amino resins are applied.

Tin decorating is still another area of use for the amino resins.

"Hypalon"

"Hypalon" is the commercial name for a new resin made by chlorinating and chlorosulfonating polyethylene. Thus, the resin may be considered as a long chain of carbon atoms, which contain chlorine atoms and sulfonyl chloride groups at intervals. The resin is elastomeric in nature and may be vulcanized because of the highly reactive sulfonyl chloride groups which react with a wide variety of materials such as metallic oxides. Thus, litharge or lead oxide is one of the common curing agents for "Hypalon". There is a wide variety of others and the resin is compatible with resins such as urea-formaldehyde, styrene-butadiene, chlorinated rubber, epoxy resins, phenolic resins and certain polyamide resins. Because of its elastomeric nature, the coating is extremely flexible and may be applied to flexible substrates such as rubber, which are apt to be distended. The films have excellent ozone resistance, which makes them desirable for the protection of rubber. In addition, they may be used as primers where chemical resistance is required, and they are recommended as industrial finishes for steel and as coatings for electrical insulation. Wood and masonry surfaces may also be coated with "Hypalon" and conductive coatings may be formulated by pigmentation with leafing aluminum pigment.

NEWS

Federation To Compile New Materials List

The materials committee of the Federation of Paint & Varnish Production Clubs is compiling a list of new materials of use in the coatings industry to be published during 1958 in the *Official Digest.*

Raw material suppliers are invited to submit information on new resins, pigments, chemicals, etc., to the materials committee.

It is understood that only those materials that have distinctly new properties or composition, or that have not previously been used in the coatings industry will be considered. The emphasis will be on materials that open up new possibilities for the coatings technologist.

Descriptive details, trade names, chemical names, and unique advantages of these products should be sent to the appropriate man in the following list:

T. J. Anagnostou (Chicago)—*Resins;* S. B. Levinson (New York)—*Foreign Materials;* E. J. Madigan (Rocky Mountain)—*Solvents and Plasticizers*; C. P. Mooney (Los Angeles)—*Additives;* J. Oates (New York)—*Oils and Chemicals;* R. Toothill (Philadelphia)—*Pigments;* R. L. Whitney (New York)—*Emulsion Polymers;* and S. L. Davidson (New York)—*Chairman.*

•

Building Costs Rise

The F. W. Dodge Corp. of New York has reported that building costs, notwithstanding market weaknesses general across the United States, have managed to squeak up another two per cent for the 12 months ending in March.

Of the two major components of construction cost — materials and labor — labor has again exhibited the greater strength.

According to M. L. Matthews, manager-editor of the Dow Real Estate Valuation Calculator, "As for the future it appears reasonable to expect that the cost to build anything from a cottage to a skyscraper will push upward at a rate of about one per cent every four months. . .But things are in such uncertain balance that a moderate drift in psychology could change the outlook one way or the other, almost overnight."

•

Sales Agent Named

Godfrey L. Cabot, Inc., Boston, has announced the appointment of Ivan T. Bauman Co. of St. Louis as its agent for the sale of carbon black in the metropolitan St. Louis, eastern Missouri and southern Illinois areas.

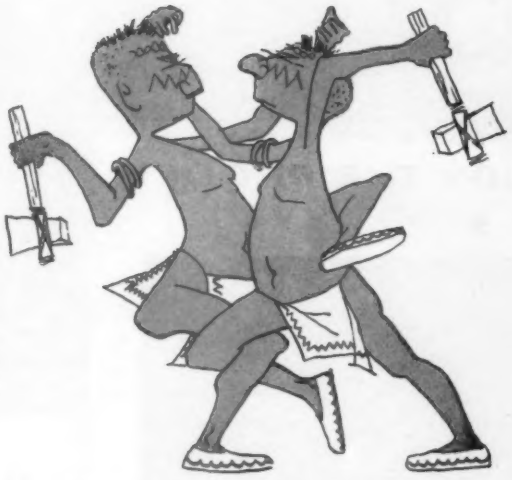
The Bauman Co. maintains its own warehouse, thus insuring a ready supply of products to customers.

Crotonic Acid Available

The successful conclusion of a one-year process improvement project involving the oxidation of crotonaldehyde to crotonic acid has been announced by Eastman Chemical Products, Inc., subsidiary of Eastman Kodak Co.

Eastman expects crotonic acid to be of considerable interest to the manufacturers of alkyd resins. The improved process of manufacture will permit the offering of crotonic acid on a commercial scale at a price structure attractive to this industry, so the firm believes. An introductory price of $.36 per pound has been established.

SCALPING IS PRIMITIVE
HOW ABOUT YOUR PAINT



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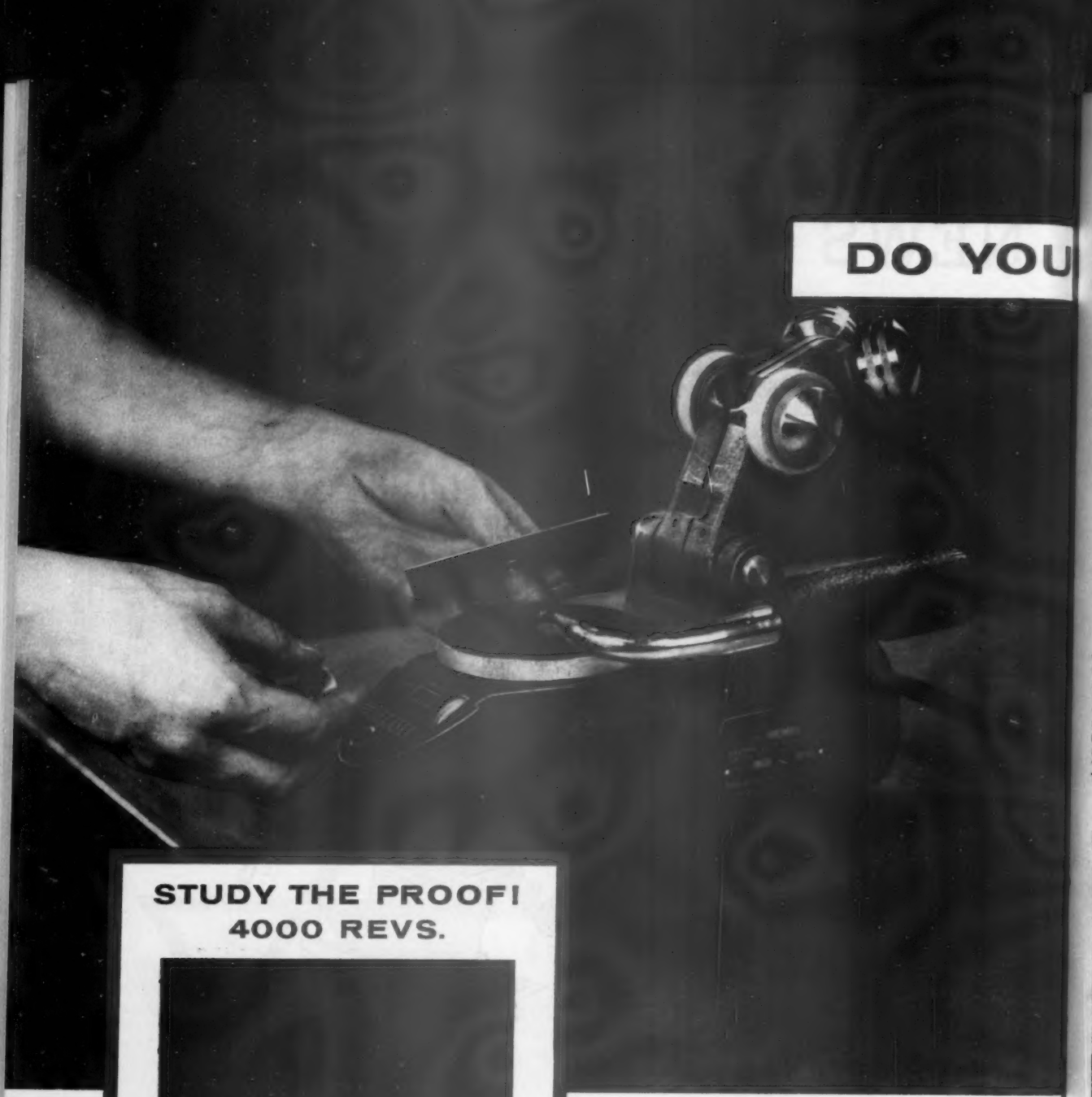
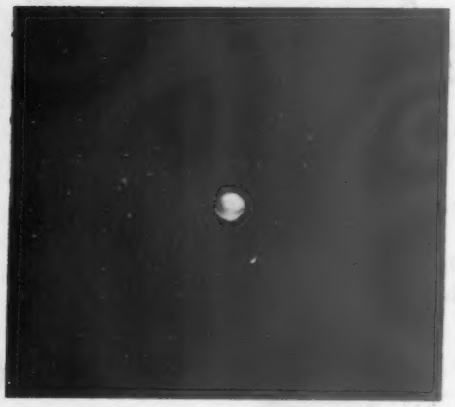


STUDY THE PROOF! 4000 REVS.



COATING BASED ON BAKELITE RESIN STILL INTACT AFTER 4000 REVOLUTIONS... COMPETITIVE COATINGS FAILED AFTER

528 REVS. 88 REVS. 497 REVS.

How this test was made:

After 4000 revolutions under a 17H Tabor abrasive wheel in Tabor Abrasor, the large panel shows little sign of wear. It was coated with a BAKELITE Vinyl Organosol over a white metal primer also based on vinyl resins. Standard baking coatings in the three lower photos wore through to the primer in 528, 88, and 497 revolutions respectively.

CUSTOMERS ASK FOR:

Better scuff resistance?

Destructive abrasive test proves the wearing qualities of organosol coating based on BAKELITE Brand Vinyl Resins.

TRY A TYPICAL FORMULATION

ORGANOSOL FOR SCUFF RESISTANCE XDE-5137

VYNV-1	21.3
VAGH	5.3
Rutile Titanium Dioxide	5.6
Phthalocyanine Green	0.2
"Flexol" DOP	7.3
Lecithin NS	0.1
DIBK	7.5
Methyl "Cellosolve"	7.5
"Solvesso" #100	22.4
Toluene	22.8
	100.0

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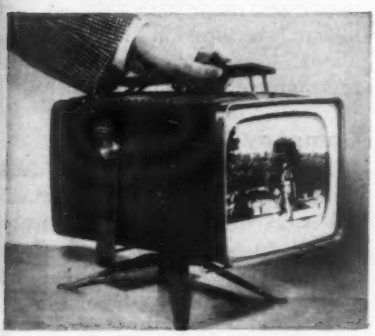
that makes customer-satisfying formulations. Bakelite Company offers the widest range of resins of the highest quality and uniformity. Talk with your Bakelite Company Technical Representative. He'll give you all the latest information, and supply you with samples for your own testing program. Or use the coupon below.

EXCELLENT PROPERTIES OPEN NEW MARKETS



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NEWS

New Alkyd Coating Resins Reported

The creation of potentially new classes of synthetic coating resins, by copolymerizing alkyd resins with various monomers, was described by researchers of the Heyden Newport Chemical Corp. before the spring meeting of the American Oil Chemists Society.

"New light color, fast-drying vehicles, with excellent resistance to water and chemicals, and in some cases, improved cigarette resistance can be produced by modifying alkyd resins with styrene and methyl methacrylate monomers and thermosetting resins," reported Dr. William M. Kraft and Alex Forshirm of Heyden Newport's applications laboratory.

The new classes of coatings were said to exhibit excellent mar resistance and flexibility.

According to the authors, striking results obtained in an alkyd-urea resin, made with a 60 per cent initial esterification high polymer alkyd, forecast the possibility of more efficient furniture finishes.

•

Company Moves

Perry & Derrick Co., Inc., manufacturers of paint and varnish, has moved its offices and warehouse to 2510 Highland Ave., Norwood (Cincinnati 12,) Ohio, it has been announced.

Located on a three-acre tract containing 13 structures, the new plant was purchased from the Continental Can Co. in January.

Manufacturing facilities will continue to be housed in the firm's Dayton, Ky. plant for the next few months.

•

L. E. Wink Passes

Lloyd Ellwood Wink, 52, Philadelphia vegetable oil salesman for Cargill, Inc., died recently after a brief illness.

Mr. Wink had been previously associated with the Bisbee Linseed Co. for 25 years.

He was a graduate of Mercersberg Academy and a member of the Mixer's Club.

NEWS

Package-Unit Reduces Pail Handling Time

"Handy-Pak," developed by Bennett Industries, Inc., is a new and different way to pack empty steel pails for shipment to manufacturers.

The unit is said to reduce the time required to unload a freight car of pails from 21½ to 2½ man-hours. A manufacturer buying steel pails packaged in "Handy-Pak" can, according to Bennett, save 90% of handling time each time he handles a carload of pails.

The 27-pail package can be easily carried by two men, and one man can drag the unit across the floor.

"Handy-Pak" permits pails to be stocked 15 high instead of nine or ten high, which increases the capacity of a storage area up to 40%.

The package consists of a top and a bottom cap of corrugated board between which 27 steel pails are packed in three layers. The entire assembly is held firm and unitized by steel straps.

Shown above is new package unit being offered by Bennett Industries for shipment of empty steel pails to manufacturers. Two men can easily carry unit which holds 27 five-gallon pails during shipment and storage.

•

Aid To Education

Approximately $100,000 in unrestricted grants-in-aid is being distributed by Hercules Powder Co. to some 24 American colleges and universities.

This is the third consecutive year Hercules has carried out this aid-to-education program, giving the schools complete freedom in the use of these funds.

Ten grants went to chemistry departments, eleven to chemical engineering, one each to schools of mining engineering and business administration and two for industrial liaison membership.

Recipients are selected from year to year on a cyclic basis.

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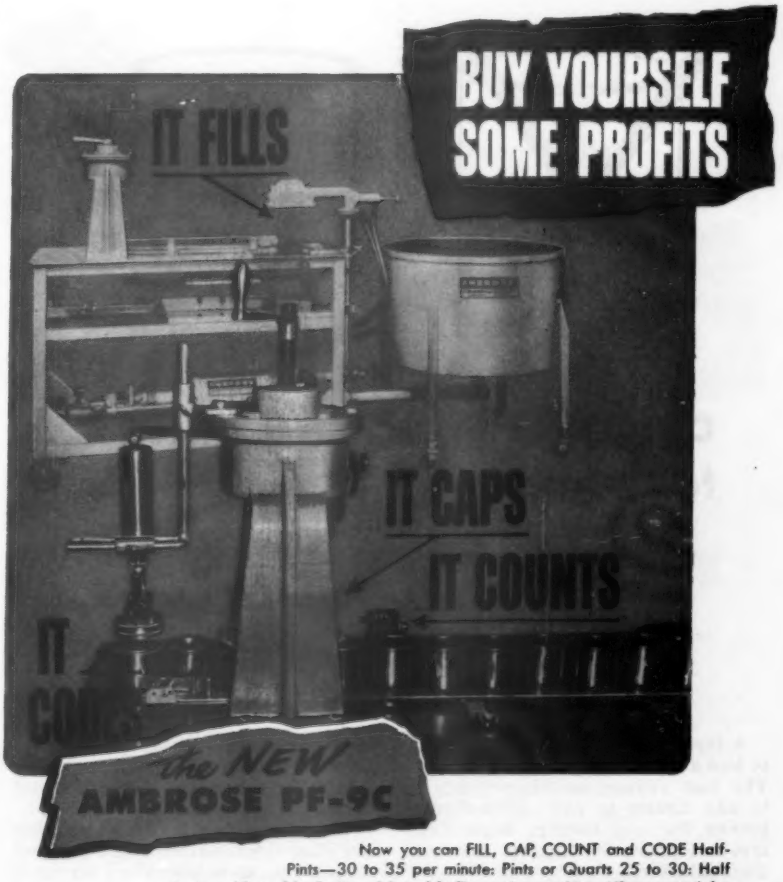
Sindar Moves N. Y. Office

The Sindar Corp. has announced the removal of its offices from 330 West 42nd Street to 321 West 44th Street, New York 36, N. Y.



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abstracts

The following are abstracts of papers presented at the April 13-18 meeting of the American Chemical Society, Division of Paint, Plastics and Printing Ink Chemistry, in San Francisco, Calif.

Modulus of Elasticity In Study of Paints

By H. van Hoorn and P. Bruin, Koninklijke/Shell-Laboratorium, N.V. De Bataafsche Petroleum Maatschappij, Amsterdam.

Description of the physical properties of paint and varnish films on substrates is a difficult problem. Many physical tests have been developed, which all together can describe the physical behavior of paint and lacquer films very satisfactorily, but each of which of itself is easy to criticize. Consequently there is still a need for physically purified measuring techniques.

In our search for such methods a new technique was developed a few years ago for the investigation of supported asphalt layers. In this method the resonance frequencies of small metallic bars, both as such and after being covered with a thin layer of asphalt, are determined. From the differences in resonance frequencies mechanical properties such as the dynamic modulus of elasticity and the damping could be determined.

This lecture describes the method of determination in general, adaptation of the method to paint and varnish films, its sensitivity for small variations in the constitution of the films, and its value for the study of paint and varnish films.

These points are discussed on the basis of results obtained in an investigation into the through-hardening of a number of Epikote-based systems.

CPVC of PVAc Paints By Pigment Water Sorption Method

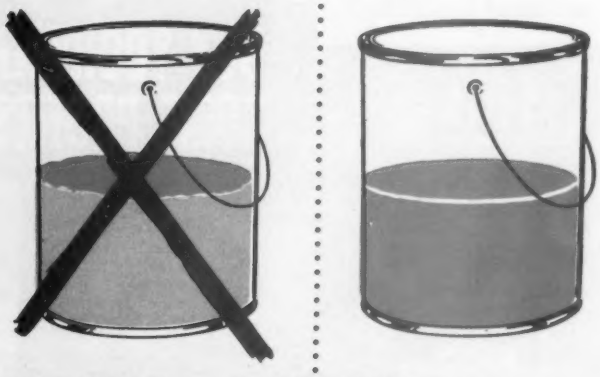
By Felix P. Liberti and Raymond C. Pierre-humbert, Research Laboratories, National Starch Products, Inc., Plainfield, N. J.

In the formulation of paints the formulator must draw on his vast knowledge and experience in the selection of raw materials to obtain the performance for which the product is intended.

To aid the paint chemist in the formulation of vinyl acetate copolymer paints, water sorption values of both prime and extender pigments have been established by titrations with a dispersant solution consisting of Tamol 731 and potassium tripolyphosphate. These values have in turn been utilized in a simple calculation for the determination of a theoretical critical pigment volume concentration (CPVC).

A series of pigments and pigment combinations has been evaluated for critical pigment volume concentration determinations by scrub test method, tensile strength, and elongation. The test data show that theoretical critical pigment volume concentration derived by the water sorption value (calculated) approximates that obtained by the above methods with a variation of approximately ± 3%.

To determine the reproducibility of critical pigment volume concentration by water sorption method, other copolymer emulsions, differing in particle size and molecular weight, were evaluated. Results obtained indicate that the particle size of the emulsion does not necessarily influence the critical pigment volume concentration.



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While water sorption values can be used to determine the critical pigment volume concentration of a vinyl acetate copolymer paint, this determination is useful only in establishing a proper balance of pigment to resin solids in order to obtain optimum paint properties. This method should be utilized to save the formulator countless hours of trial and error methods of determining critical pigment volume concentration.

Effect of Solvents on Film Formation

By Valeria Artel, California Research Corp., El Segundo, Calif.

The evolution of a film structure during the drying of resin solutions proceeds in different manners, depending upon the nature of the solvent. Changes occurring in surface viscosities of thin films as solvent evaporates have been measured for several resin-solvent systems, using a torsion-pendulum surface viscometer. In solutions containing isoparaffinic solvents, the thin film surface viscosity increases abruptly after partial evaporation of the solvent. Practically no further increase occurs after this initial change. A different behavior is manifested by films cast from aromatic solvents: The viscosity climb is more gradual, reaching its maximum at a much later stage in the evaporation. Normal paraffins and cycloparaffins follow an intermediate course, the exact nature of which may vary with the specific hydrocarbon and resin comprising the system.

The critical factor governing which of the two patterns will be followed by any given system is the ratio of surface evaporation rate to bulk diffusion rate of the solvent. Thin films of solutions with solvents possessing the highest ratio will display the sharpest viscosity increase; as this ratio is lowered the thin film viscosity increase becomes more gradual. The diffusion rates, determined with the California Research Corp. Evapograph, were found to be related to the size and shape of the solvent molecule. As a result, solvents of the same boiling point often give widely different ratios of evaporation rate to diffusion rate.

Temperature Studies On Phenolic Films

By J. A. Spangler, S. E. Susman, and F. J. Riel, Narmco, Inc., San Diego, Calif.

A simplified form of the vibrating reed elastometer is described with respect to the study of phenolic films and their changes in modulus of elasticity with aging at elevated temperatures. The primary advantages realized by use of the elastometer in this study were: (1) the simplicity and low cost of the apparatus, (2) the short time required for a determination, (3) the small size of specimen required, and (4) the nondestructive nature of the test.

The elastometer used consisted of a 12-inch PM loudspeaker with cone removed and a driver rod attached directly to the voice coil in such a way that positive pressure was exerted against the sample reed at a point in close proximity to the clamped end of the reed. The loudspeaker voice coil was driven directly by a variable-frequency generator without an amplifier. Phenolic films approximately 0.010 inch thick were prepared successfully by casting a film on sheets of plate glass. Sample reeds were cut from the cured films by means of a specially designed miniature table saw. Data illustrating the variation of elastic modulus with aging at 500°F. are presented for selected samples of pure phenolic resin as well as laminated specimens.

Paints From Emulsifier Free Vinyl Acetate

By W. F. Scheufele and N. G. Tompkins, Dewey and Almy Chemical Co., Division of W. R. Grace & Co.

Two emulsifier-free vinyl acetate copolymer emulsions have been examined as to the rate at which their dry films absorb water and as to the maximum quantity absorbed. These data have been compared with similar data on conventional emulsifier-containing copolymer dispersion films. Results show that the emulsifier-free dispersion films absorb water at a slower rate, although they exhibit higher equilibrium water contents.

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and have been found to be superior to similar paints made from conventional emulsifier-containing copolymer dispersions in resistance to water spotting, resistance to wet pigment rub-off, and resistance to wet abrasion.

Methods of formulating satisfactory high PVC water-thinnable paints from emulsifier-free vinyl acetate copolymer emulsion have been compared with normal formulation methods used with conventional emulsifier-containing vinyl acetate copolymer emulsions and the principal differences have been noted and discussed.

The following are abstracts of papers presented at the autumn meeting of the German Chemical Society, Paint and Pigment Division.

Electrical Conductivity of Zinc Dust Paints

By H. Ladeburg

Briefly, the author first described the corrosion protective action of zinc dust paints, which in addition to natural protective coating formation, is based on the cathodic protective action of zinc. Details were given of investigations which had been conducted on paint finish systems of this type with a varying pigmentation.

For this purpose, zinc metal dust of a varying particle size was used with a varying zinc oxide content added. The concentration of the zinc metal dust was changed step by step–within the range usual for zinc dust paints. The electrical conductivity was measured on glass plates, parallel to the paint coating, with an electrode spacing distance of 27 mm. The measurement was taken on the paint films before usage and after subjection to the action of various agencies. Such agencies were alternating exposure, action of sea water, and atmospheric exposure. Steel sheets, which had been coated with the same zinc dust paints, were simultaneously exposed in the same corrosion test apparatus.

Polystyrol, chorinated rubber and cyclicized rubber were used as the filming agents for these zinc dust paints. The results of the electrical conductivity measurements and of the corrosion tests were discussed in detail by the author.

The final results of this work fully established that the best electrical conductivity does not occur with the zinc dust paints of a high zinc metal content.

The conductivity measurements agree, as was explained by the author, with the corrosion protective effects of the changing of the filming medium content. With varying zinc oxide addition on the other hand, the results deviate. The conductivity was measured on paint coatings applied with the most favorable and constant coating thickness before the beginning of the test series, during the moisture storage and during the corrosion tests.

In the discussion of this paper, it was stated by Prof. D'Ans, on the basis of his own observations, that the filming medium coating which envelopes the zinc dust particles must have a certain thickness. In spite of this filming coating, an electron flow still occurs between the particles. It is not known, however, how thick this enveloping skin must be in order that electrons may still pass through it. The effect, as such, was all that was known at the moment.

It was mentioned that below zinc dust finish coatings, there were found deposits of zinc compounds; but it was stated by Dr. Ladeburg that if the film had not been damaged, no such deposits would be found. An indication of the electrical conductivity of zinc dust paint films is that spot welding can be conducted through the paint film. If, however, the filming medium content exceeds 5 to 6%, the possibility of spot welding in this manner is lost.

An outline of the possible phenomena which occur during the weathering of these paints, was given. It was considered that the zinc dust metal particles lying in the interior of the paint film are surrounded by the filming medium, and thus protected. The zinc metal particles lying at the top of the film, on the other hand, lose this protective effect within a short time because of wear. The zinc metal is bared and forms salts under the action of the atmosphere. These, then, become imbedded in the pores of the film, which they fill.

When studying the action of zinc dust paints, special attention must be directed to the boundary surface of zinc dust film sub-surface. Precisely, as with other paint systems, the phenomena occurring at this boundary surface cannot be easily ascertained by

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measurement. It had been established by Prof. D'Ans that at the beginning of service a temporary conductivity can be established. This could indicate that with this paint system, there is an initial, short-period cathodic action, with a corrosion-restricting action of the basic zinc salts formed in the film, which form a cover coating.

Existing knowledge, which is available up to now on zinc dust paints, can be assembled and summarised as follows:

1. A cathodic protection is possible, at least in the initial condition.
2. The protective coatings form zinc compounds which are deposited and this can lead to a cementing and a sealing-off effect in the paint film.

The formation of a cover coating is very important with corrosion-protective paints. Thus, lead cyanamide pigment, for example, like zinc, similarly forms only a cover coating, but it is completely satisfactory in regard to its rust-protective characteristics.

Some weathering tests were conducted in various locations, under varying conditions. A styrolized alkyd, V 949, was used as the filming medium with these paints. With these tests, it was found that after lengthy weathering exposure, strong corrosion was obtained if only zinc dust was used as the filler material in the paint. On the other hand, a zero degree of rusting was obtained with an additional content of 20% of zinc oxide.

From other quarters, it was reported that weathering tests of zinc dust paints in a marine atmosphere had shown that two factors are of decisive importance for the manner in which the zinc dust paint stand up in use. These are the coating thickness of the paint film and the particle size of the zinc dust material. A coarse grained zinc dust has been found to be unsuitable.

Further information was given on tests which have been conducted within recent years on the application of certain cover coatings on zinc dust primer paints. It has been found that after about a year, the whole paint coating can lift up and that the bare steel surface can be seen. It is considered that the stresses caused by the cover coating are responsible for this, as the zinc dust film can not withstand these stresses. A more likely cause, however, is possibly the generation of hydrogen from the reaction of the zinc metal, leading to "blowing" and lifting of the paint coatings.

It was considered that a fine grained zinc dust material would probably be better and behave better, because the zinc hydroxide formed here could bed-in better into the paint film, than would be the case with a coarser material. The complete action of zinc dust paint films in practice is of a complex nature, consisting of many individual factors. The most important of these, however, are the cathodic protective effect and the cover-coating formation.

Pigments for Corrosion Protection

By H.J. Schuster and Prof. D'Ans.

Details were given in this research paper on corrosion protection which had been undertaken on paint finishes containing as the pigment red lead and zinc metal dust. The paper outlined the important role played by the pigments in corrosion protection. The formation of protective coatings which such pigments are able to build-up was considered in detail. This procedure is accompanied by a chemical change which certain pigments such as red lead, zinc dust, lead cyanamide and the basic lead and zinc chromates gradually undergo in the film.

With these pigments, the simple, highly basic aquo or hydroxy compounds, through their ionic charge which is electrochemically conducted, are preferably precipitated at the active places of the base metal with the formation of a dense, protective coating. This cover coating, which is produced by the pigments, was given lengthy consideration by the author and the physicho-chemical relationships existing were then considered, particularly the nature of the corrosion cells.

This influence of the basic pigments was investigated in particular as well as their special tasks with corrosion prevention. In this connection, it was mentioned that these pigments not only can neutralize oxygen with the formation of

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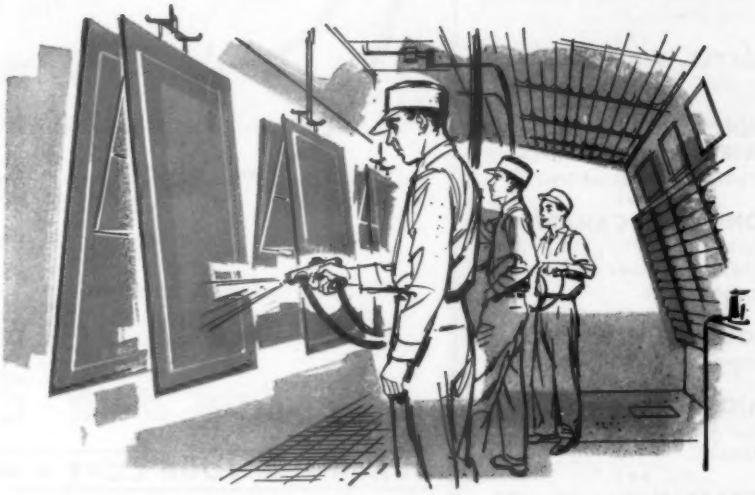

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insoluble, basic salts, but also are particularly effective in increasing the pH number over the neutral point in finish coatings which have become wet.

The electrochemical relationships of corrosion were dealt with by means of a comprehensive diagram, and the influence of the conductive resistance of the corrosion cells on the current density. The cathodic polarization and the change in the electrode potential were dealt with individually.

Considered were the relationships between the hydrogen ion concentration at the cathode, and the current density and the height of the maximum current density with the difference of the static potential. The question was raised as to what extent local, coarser differences in the thickness of the coating affect potential differences and accordingly, corrosion foci.

By means of this theoretical survey, it was shown what great significance can be attached to the corrosion protective action, and to these cover coatings which are formed in the paint coating. Within the scope of this detailed and comprehensive paper, the author also considered the theoretical problems of zinc metal dust coatings. The corrosion-restricting action of chromates in wash primers was also dealt with. The considerations which were given, which had been amplified by interesting new observations, were intended by the author to be regarded specially as directed toward the most important problems on the corrosion behaviour of iron and steel. The survey into the nature of the corrosion-restricting phenomena occurring in a below the paint coating leads to the logical conception, that with the testing of corrosion-protective paint finishes, electrical measuring test procedures should be applied more than has hitherto been the case.

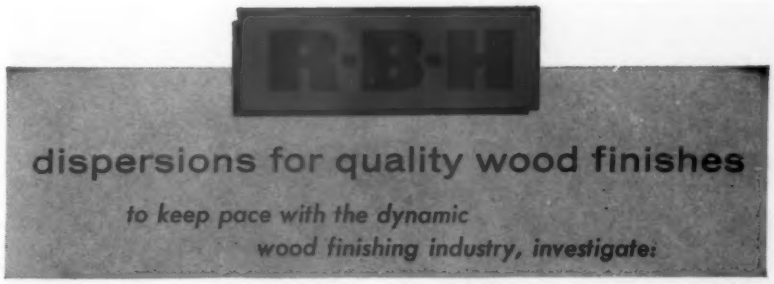
Particularly interesting details were given in this paper on red lead-mixed pigments, in which the active pigment is applied on the carrier. Also given were details of a wet process for the preparation of a very finely divided lead di- and tetravalent oxide. The behaviour of this material in a primer paint coating was described.

The question was raised as to whether all metals with a variable valency would be fundamentally suitable for corrosion protection. In such a case, titanium, which has both a tri-and tetra valency, would be suitable. It was asked to what extent a parallel could be drawn between the effect of the dual valency of lead in red lead with the titanium oxides. It was stated that in the opinion of Prof. D'Ans, that trivalent titanium oxide could be capable of forming such a cover coating as mentioned above, but atmospheric oxygen would then be needed for this purpose. Regarding zinc, a parallel is possible but the effect would be limited.

The question was raised as to whether inert pigments with a lead content of 20% would actually embody a corrosion-protection action. Such pigments would include those which are only covered on the surface of a carrier with the lead oxide. It was stated that pure red lead, in itself, has too great a reserve of pigment, and that a 20% content of lead would provide sufficient protective effect. The thin coatings give the most valuable corrosion protection, but they are too weak mechanically to give a protective coating. On the other hand, if the coatings become too thick, then there exists the danger of crystallization. Fine division of the pigment also plays an important role in this connection.

Further questions were then raised regarding the preparation of lead di-tetravalent oxides, by the wet process. It was confirmed by the author that the preparation of the pigment, in this manner, is quite simple.

The question of rust converters was also raised. It was generally agreed, that in exceptional cases, an iron protective coating can be produced chemically. The use of hydrazine in the protection of steel boilers was given. In some cases, too much was used and consequently, the natural protective coating of the iron was dissolved away; the iron lost its protection and pitting holes were formed. In the case of rust converters, in order that the conversion into iron phosphate can occur, it is necessary for the amount relationship to be stochiometrically chosen.



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Measurement of Flow Characteristics of Lacquers

By D. Wapler

The author gave details of measurements which had been carried out with the most important structural viscosimeter types on lacquers of the most varying types of viscosity. After a description of the viscosimeters used in the carrying out of the measurements, the results obtained were discussed. It was found that with Newtonian fluids, there is generally sufficient agreement between the values which are given with absolute viscosimeters and those which are measured with relative viscosimeters.

On the other hand, for structural viscous or thixotropic lacquers, considerable differences occured in part, and this was considered by the introduction of various individual examples and by the discussion of various diagrams. These differences were understandable, taking into consideration the measuring procedures with the various viscosimeters and the actual range of the fall velocity. This was demonstrated by the author in detail. The field of application for the practical viscosity measurements of lacquers for the individual test apparatus was discussed and explained on the basis of the results obtained.

The influence of the pigmentation on the flow behaviour was studied on some lacquers pigmented with titanium dioxide. Further, the influence of the evaporation was tested with various viscosimeters. It was pointed out by the author that the significance of the measurement of the flow behaviour for practice would have been increased if the measurements were taken in the speed ranges of interest for practical application. Finally, the author dealt with the application limits ascertained during the course of this work for the various test apparatus used.

The value that such comparitive investigations possess will be clear to every technician. They serve to characterize not only any particular type of measuring instrument but serve also to recognize what was brought out in this paper. These are, respectively, the application limits of the instruments, and the correctness and value of the individual test measuring methods. Finally, they give the possibility to the practical technician of deciding the correct field of application for a certain given measuring process.

With these investigations conducted on the measurement of the flow behaviour of lacquers and its significance for practice, other comparitive research work conducted at the Stuttgart Institute is serving to clarify other problems connected with the physical characteristics of paints and lacquers, such as the hardness measurements of finish films and the elasticity behaviour.

Problems Relating to Finish Research

By Prof. D'Ans

Starting with the requirement which a paint finish film has to fulfill in order to be satisfactory, the author occupied himself particularly with the question of the adhesion to various sub-surfaces and dealt in detail with the boundary layer problems at the contact surface of lacquer film-sub-surfaces. Regarding the wetting phenomena at this boundary surface, the author drew comparisons with phenomena which are noted with flotation procedures. The influence of the orientation of the macro-molecules and the arrangement of the macro-molecules on various paint finish characteristics were dealt with in detail.

The relationships between the wetting and adhesion were brought out, and associated pigmentation problems were discussed. Observations were made which showed that acid-soluble pigments had been enveloped so strongly by the filming medium that they were withdrawn considerably from the action of an acid solution, although the acid can diffuse through the finish film.

By means of various examples, the influence of the pigment surfaces on the total characteristics of a lacquer film was discussed. It was indicated that systematic investigations on the phenomena involved are still lacking.

Surface tension forces are of decisive influence on the compatibility and on the adhesion. They are also responsible for the relationship between pigment and filming medium.

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POLYCO 2719 Acrylic adds
IMPROVED LEVELING

For use in all types of acrylic-based paints, this new 100% acrylic copolymer gives improved leveling over conventional acrylic emulsions. What's more, it can be used interchangeably on a pound-for-pound basis with any other acrylic emulsion without reformulation.

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This foolproof Borden emulsion is a true vinyl acetate copolymer, exhibiting extremely fine particle size, borax stability and excellent water resistance. Its smaller particle size offers superior pigment-binding properties and permits the use of a higher P.V.C. This makes it less costly to use than old-fashioned homopolymers. In addition, POLYCO 804 offers unequalled uniformity and ease of formulation.

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TECHNICAL Bulletins

CANNED MOTOR PUMPS

Four-page Bulletin 1050-3 details features and specifications of company's line of pumps for general process pumping. Included are performance curves for pumps up to 15 horsepower, dimensions, principles of construction and operation, cutaway views and other descriptive material.

Also available is Bulletin 1070 which describes and illustrates a group of typical pumps for high pressure fluid handling.

These pumps are used widely in high-pressure test loop work, radioactive fluid handling and in other services requiring zero leakage pumping in pressurized systems.

Chempump Corp., Dept. PVP, 1300 E. Mermaid Lane, Philadelphia 18, Pa.

ORGANIC CHLORINE

Eleven organic chlorine compounds available in commercial quantities are described in a 45-page booklet published by Union Carbide Chemicals Co., Division of Union Carbide Corp., Dept. PVP, 30 E. 42nd St., New York 17, N. Y.

The booklet, entitled "Organic Chlorine Compounds," details physical and physiological properties, use information, shipping regulations, handling and storage, and specifications and test methods for the compounds described.

Also discussed are the applications for the compounds as fumigants, solvents and extractants, degreasing agents, dewaxing compounds, and intermediates in the manufacture of other chemicals.

Complete instructions for test procedures are given. There is also a table of constant boiling mixtures, and there are 13 charts of physical properties of various compounds and mixtures.

ELECTRIC FORK TRUCKS

Accessibility and maintenance features of the Clarkshift Electric 20, a new battery-powered fork truck of 2000 lbs. capacity, are presented in a six-page brochure published by the Industrial Truck Division, Clark Equipment Co., Dept. PVP, Battle Creek, Mich.

Photographs and drawings illustrate the EC-20 and full dimensions, specifications and performance characteristics are included.

WATER REPELLENTS

A publication on silicone masonry water repellents directed to maintenance and painting contractors has been made available from the Silicone Products Department, General Electric Co., Dept. PVP, Waterford, N. Y.

Designated CDS-121, this booklet is entitled "How to Increase Your Profits by Applying Silicone Masonry Water Repellents."

Also available is C-14, the latest listing of suppliers of masonry water repellents containing the company's silicones. C-14 lists formulators, their addresses and the names of their silicone formulations.

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A group of aliphatic chemicals which function as bacteriostats, flexible hardeners in epoxy resins, anti-stripping agents in asphalt

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STANDARD CAN CORP. ... Lansdale, Phila., Pa.

and corrosion inhibitors and fuel additives in petroleum products is described in a newly published booklet called "Duomeens" made available by the Chemical Division, Armour & Co., Dept. PVP, 1355 W. 31st St., Chicago 9, Ill.

The booklet covers the chemical and physical properties of the Duomeens and their salts, general reactions and applications.

Technical data covering specific gravities of the Duomeens and solubilities is also contained in the booklet.

VAPOR PRESSURE

Bulletin FS-272, "Fisher Micro Vapor Pressure Apparatus", describes the new high-speed, high-accuracy technique for measuring the vapor pressure of volatile liquids, and the instrument developed for the technique.

The booklet has been made available by the Fisher Scientific Co., Dept. PVP, 384 Fisher Building, Pittsburgh 19, Pa.

Also available is bulletin FS-273, "Fisher ASTM Colorimeters," which describes new instrumentation utilizing the recently established ASTM color scale to determine color in a variety of petroleum products.

INDUSTRIAL FUNGICIDES

A 30-page catalog entitled "Industrial Fungicides" has been made available by the Nuodex Products Co., Dept. PVP, Elizabeth, N. J.

The catalog is divided into the following main sections: copper, copper 8-quinolinolates, mercurials, zincs, organic fungicides, metallo-organic fungicides, and miscellaneous.

EMULSION PAINTS

Technical Bulletin SC-24 has been made available by the Technical Service Laboratory, Emulsion Division, Dept. PVP, Reichhold Chemicals, Inc., Elizabeth, N. J.

The bulletin discusses formulation principles for emulsion paints utilizing RCI wallpol and 9304 wallpol PVAc homopolymers and 9120 wallpol VAc copolymer.

Tables and charts are included with the various descriptive data.

SUSPENSION AGENTS

Data report on Metasap 571, a pigment suspension agent for alkyd paints, has been published by the Metasap Chemical Co., Dept. PVP, Harrison, N. J.

The descriptions, applications and advantages of Metasap 571 are listed in this report.

CHROMATOGRAPHY

Bulletin No. 837, which offers a new research instrument for analysis by gas and vapor chromatography, has been made available by the Burrell Corp., Dept. PVP, 2223 Fifth Ave., Pittsburgh 19, Pa.

The bulletin describes the new Model K-5 Kromo-Tog and lists its various advantages.

HALF-SECOND BUTYRATE

A 16-mm. full-color motion picture entitled "Half-Second Butyrate—a Protective Coating for Exterior Aluminum Surfaces" has been made available by Eastman Chemical Products, Inc., Dept. PVP, 260 Madison Ave., New York 16, N. Y.

The 15-minute film discusses the laboratory and field tests made to determine the effectiveness of half-second butyrate coatings.

It also describes in complete detail how the exterior aluminum surface of a large industrial plant

From Heyden Newport

Bill Kraft, Earl Barkley, George Roberts work out Pentek® application problem.

TECHNICAL SERVICE ON PENTAERYTHRITOL FOR BETTER ALKYDS

Problem: To speed the air drying rate of long oil pentaerythritol alkyds made from low-cost tall oil fatty acid.

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For more information on the above problem solution, and for technical assistance in improving your products and processes, write or call Heyden Newport Chemical Corp., 342 Madison Ave., New York 17, N. Y.

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built in 1953 was recently restored and protected against further deterioration with this weather-resistant lacquer.

ELECTRIC FORK TRUCKS

Catalog 1319 describing electric fork truck with capacity of 3000 lbs. has been made available by Baker Industrial Trucks, Division of the Otis Elevator Co., Dept. PVP, Cleveland 2, Ohio.

The illustrated bulletin gives tables of dimensions, capacity, speeds, details of design and construction and pictures of many of the components that are built into the company's FTA-30 fork truck.

ORGANIC INTERMEDIATES

Aceto Chemical Co., Inc., Dept. PVP, 40-40 Lawrence St., Flushing 54, N. Y. has made available a 4-page catalog.

The catalog includes over 100 organic intermediates which can be supplied in commercial quantities.

Also listed are several hard-to-find organics, as well as chemicals for the dyestuff and paint industries.

DISPLACEMENT METERS

A booklet illustrating the complete standard line of positive displacement BiRotor meters for crude and product pipelines, loading racks, refineries, and other commercial liquid measurement applications has been made available by Ralph N. Brodie Co., Dept. PVP, San Leandro, Calif.

The booklet, Bulletin No. 658, details operating and mechanical specifications for 34 models in capacities from 40 gpm to 5000 barrels per hour and pressures from 125 to 1200 psi.

Nine most commonly used counters and printing counters are illustrated, color coded and keyed to show with which meters they may be used.

BUTADIENE-STYRENE

Publication of an up-to-date technical data file on Synpols (butadiene-styrene rubbers) has been made available by Texas-U. S. Chemical Co., Dept. PVP, 260 Madison Ave., New York 16, N. Y.

Full technical descriptions and specifications, physical and chemical properties, typical production values and standard test recipes are included.

ACRYLIC EMULSION

A catalog entitled "Rhoplex A-C 33, 100% Acrylic Emulsion for Interior Paints" has been published by the Rohm & Haas Co., Dept. PVP, Washington Square, Philadelphia 5, Pa.

The 28-page booklet includes the following subjects: physical properties, advantages of Rhoplex AC-33, manufacture of interior paints, bulk handling, application of paints, sealers and primer sealers, white top coats, and tint bases and colored paints.

SPECTROPHOTOMETER

A bulletin giving complete information about the firm's universal spectrophotometer has been published by Coleman Instruments, Inc., Dept. PVP, 318 W. Madison St., Maywood, Ill.

The bulletin, No. B-241, describes the unusual range of cuvettes accepted by the instrument, along with other valuable information.

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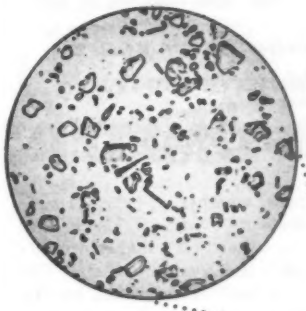

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having trouble selling a new consumer product or keeping an old one popular, the Development Dept., Evans Research, Dept. PVP, 250 E. 43rd St., New York 17, N. Y. has published a pamphlet which provides useful information.

The booklet, "A new concept in Consumer Research," also tells about the latest expansion in services at this industrial research laboratory.

MATERIALS HANDLING

The spring issue of the "Lewis-Shepard Lever," a 16-page magazine with articles describing how a wide-variety of materials handling problems were solved in various industries, has been issued by Lewis-Shepard Products, Inc., Dept. PVP, 125 Walnut St., Watertown, Mass.

Featured is a 3-page, fully illustrated article on the materials operation at a unique split-level warehouse.

THICKNESS MEASUREMENT

"The Measurement of Thickness" by George Keinath, a 79-page National Bureau of Standards Circular 585, has been made available by the Superintendent of Documents, U. S. Government Printing Office, Washington 25, D.C.

This publication, costing $.50, surveys the available information on the various methods and problems of measuring thickness that are frequently encountered in science and industry.

LICENSING

Pegasus International Corp., Dept. PVP, 1 E. 53rd St., New York 22, N. Y. has issued a booklet designed to help the business executive gain a working knowledge of the problems of foreign licensing, and to serve as a guide in avoiding its pitfalls.

"Foreign Licensing — Questions and Answers" should be of special interest to executives of American firms without prior foreign licensing experience.

The booklet is presented in question-and-answer form.

NITROPARAFFINS

A technical data sheet on formulating acrylic coatings with nitromethane and 2-nitropropane has been made available by the Industrial Chemicals Dept., Commercial Solvents Corp., Dept. PVP, 260 Madison Ave., New York 16, N. Y.

Included in this bulletin are descriptions and tables.

SILICONE PRODUCTS

The firm's major silicone products and some of the many uses for them are discussed in CDS-129, an eight-page catalog now available from the Silicone Products Dept., General Electric Co., Dept. PVP, Waterford, N. Y.

In addition to basic products and application information, the catalog also lists G-E literature providing detailed reports about specific silicones and their applications.

Measurement of physical parameters involved in the practical measurement of thickness, such as displacement, is covered. In addition, some general aspects of the measurement are outlined, such as dynamic respose.

A bibliography of references, a limited list of suppliers, and a detailed index of the gages, methods, applications, and trade names covered are appended.

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CALENDAR OF EVENTS

June 13-14. Joint Meeting of St. Louis and Kansas City Production Clubs, Coronado Hotel, St. Louis.

June 22-27. ASTM Annual Meeting, Statler Hotel and Sheraton-Plaza, Boston, Mass.

July 7-11. Organic Coating Conference, Gordon Research Conferences, New Hampton School, New Hampton, N. H.

Production Club Meetings

Baltimore, 2nd Friday, Park Plaza Hotel

Chicago, 1st Monday, Furniture Mart.

C.D.I.C., 2nd Monday.
Cincinnati — Oct., Dec., Mar., May, Hotel Alms.
Dayton — Nov., Feb., April, Suttmilers.
Columbus — Jan., June, Sept., Fort Hayes Hotel.

Cleveland 3rd Friday, Harvey Restaurant.

Dallas, 1st Thursday after 2nd Monday, Melrose Hotel.

Detroit, 4th Tuesday, Rackham Building.

Golden Gate, 3rd Monday, Sabella's Restaurant, San Francisco.

Houston, Monday prior 2nd Tuesday, Ship Ahoy Restaurant.

Kansas City, 2nd Thursday, Pickwick Hotel.

Los Angeles, 2nd Wednesday, Scully's Cafe.

Louisville, 3rd Wednesday, Seelbach Hotel.

Montreal, 1st Wednesday, Queen's Hotel.

New England, 3rd Thursday, University Club, Boston.

New York, 1st Thursday, Brass Rail, 100 Park Ave.

Northwestern, 1st Friday, St. Paul Town and Country Club.

Pacific Northwest, 3rd Thursday, Washington Athletic Club, Seattle, Wash.

Philadelphia, 3rd Wednesday, Philadelphia Rifle Club.

Pittsburgh, 1st Monday, Gateway Plaza, Bldg. 2.

Rocky Mountain, 2nd Wednesday, Republican Club, Denver, Colo.

St. Louis, 3rd Tuesday, Kings-Way Hotel.

Southern, Annual Meetings Only.

Toronto, 3rd Monday, Oak Room, Union Station.

Western New York, 1st Monday, 40-8 Club, Buffalo.

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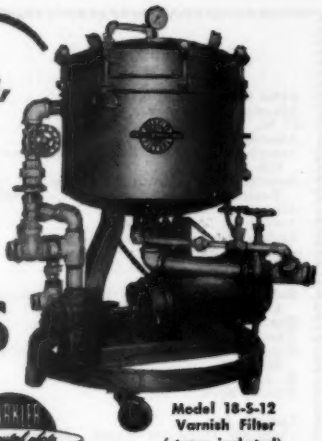

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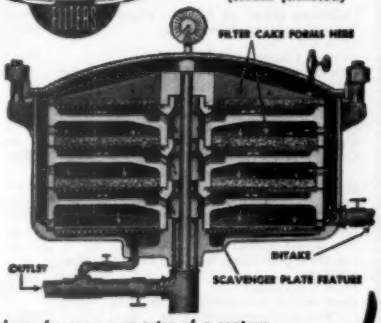

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Sales Representative Named

The St. Joseph Lead Co. has appointed Harwick Standard Chemical Co., Akron, Ohio, as sales representatives for free zinc oxides.

The sales territory will include the states of Georgia, North and South Carolina and eastern Tennessee.

Sales contacts in these areas will be made by Albert Koper and Aaron Groce from the branch offices in Albertville, Ala. and Greenville, S. C.

•

New Unit Planned

Kolker Chemical Corp., Newark, N. J., has announced plans for the construction of a phthalic anhydride unit to be located at its Newark plant.

•

Distributor Named

Appointment of Bate Chemical Corp. Ltd. of Toronto as distributor of Pliolite resins produced by the chemical division of the Goodyear Tire & Rubber Co. has been announced.

With sales and warehousing facilities in both Toronto and Montreal, Bate will provide sales and technical service to paint and coating accounts for Pliolite S-3, S-5, S-7 and VT solution resins and natural rubber Pliolite.

CLASSIFIED ADVERTISEMENTS

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ADVERTISERS' INDEX

Abbé Engineering Co.	92
Alkydol Laboratories, Inc.	51
C. M. Ambrose Co.	93
American Can Co.	May
American Cyanamid Co. (Pigments Div.)	4
American Cyanamid Co., (Plastics & Resins)	3rd Cover
American Zinc Institute	May
American Zinc Sales Co.	14
Archer-Daniels-Midland Co.	18, 19
Arizona Chemical Co.	72
Atlas Electric Devices Co.	104
Bakelite Company, A Div. of Union Carbide Corp.	90, 91
Barrett Div., Allied Chemical Corp.	6
The Borden Co.	100
Borg-Warner Corp., Marbon Chemical Division	78
R. J. Brown Co.	May
Buhler Bros.	May
Cargill, Inc.	May
Celanese Corp. of Amer., Chemical Div.	32
Celanese Corp. of Amer., Plastics Div.	May
Cellofilm Industries, Inc.	May
Ciba Co., Inc.	85
Colton Chemical Co.	May
Columbian Carbon Co., (Mapico Color Unit)	45
Columbian Carbon Co. (Paint-Dispersions)	May
Commercial Solvents Corp.	74
Continental Can Co.	24
Continental Carbon Co.	May
Davies Can Co.	86
Davison Chemical Co., Div. W. R. Grace & Co.	70
Deutsche Hydrierwerke GMBH	88
Diamond Alkali Co.	68
Dicalite Division, Great Lakes Carbon Corp.	May
Dow Chemical Co.	38, 39, 40
DuPont de Nemours & Co., Inc., E. I. (Electrochemicals Dept.)	May
DuPont de Nemours & Co., Inc., E. I. (Explosives Dept.)	May
DuPont de Nemours & Co., Inc., E. I. (Pigments Dept.)	76, 77
DuPont de Nemours & Co., Inc., E. I. (Pigment Dept. Colors)	May
The Eagle-Picher Co.	30
Eastman Chemical Products Co., Inc.	17, 71
Emery Industries, Inc.	97
Farnow, Inc.	75
Fein's Tin Can Co.	101
Firestone Plastics Co.	54, 55
General Dyestuff Co., General Aniline & Film Corp.	9
General Tire & Rubber Co.	27
Georgia Kaolin Co.	May
Georgia Marble Co.	May
Glidden Co.	61
Glycerine Producers A'ssn.	56
B. F. Goodrich Chemical Co.	May
Grace Chemical Co.	May
Harshaw Chemical Co.	60
Hercules Powder Co.	64
Heyden Newport Chem. Corp.	102
Herman Hockmeyer & Co.	May
Hope Machine Co.	May
Imperial Paper & Color Corp.	81
International Talc Co.	66
Jersey State Chemical Co.	May
Johns Manville Corp.	28
Kellogg & Sons, Inc., Spencer	46
Kentucky Color & Chemical Co.	65
Key Chemical Co.	May
H. Kohnstamm & Co.	May
J. M. Lehmann Co.	May
Liquid Carbonic Corp.	May
Mapico Color Unit, Columbian Carbon Corp.	45
Marbon Chemical Div., Borg-Warner Corp.	78
McDanel Refractory Porcelain Co.	69
Metasap Chemical Co.	96
Minnesota Linseed Oil Co.	8
Monsanto Chemical Co., (Plastics Div.)	10, 11
Naftone, Inc.	89
National Aniline Div., Allied Chem. Corp.	13
National Can Co.	84
Neville Chemical Co.	Front Cover
New Jersey Zinc Co.	12
Newport Industries Inc. (Heyden Newport Chem. Corp.)	May
Nopco Chemical Co.	79
Nuodex Products, Inc.	94
Oronite Chemical Co.	20
Pacific Vegetable Oil Co.	63
Patterson Foundry & Machine Co.	May
Pennsylvania Industrial Chem. Corp.	73
Phillips Petroleum Co.	16
Photovolt Co.	106
Pittsburgh Coke & Chemical Co.	26
R-B-H Dispersions Co.	99
Reichhold Chemicals, Inc.	2nd Cover
Rohm & Haas Co.	29
St. Joseph Lead Co.	103
Shawinigan Resins Corp.	23
Shell Chemical Co.	3
Shell Oil Co.	25
Sinclair Chemicals, Inc.	May
Skelly Oil Co.	21
Socony Mobil Oil Co., Inc.	May
Solvents & Chemicals Group	82
Sparkler Mfg. Co.	105
Standard Ultramarine & Color Co.	95
Titanium Pigment Co.	80
Troy Chemical Co.	May
Troy Engine & Machine Co.	4th Cover
Union Carbide Corp.	22
U. S. Stoneware Co.	62
Van Ameringen-Haebler, Inc.	87
Velsicol Chemical Corp.	31
C. K. Williams & Co.	83
Witco Chemical Co.	15
G. S. Ziegler & Co.	May

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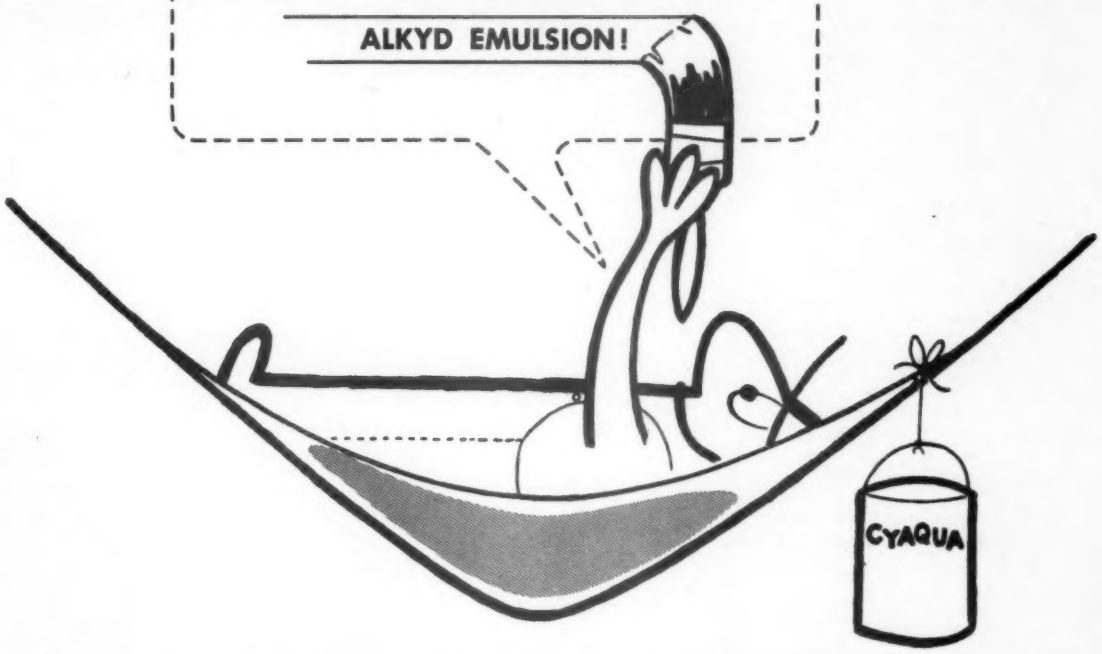

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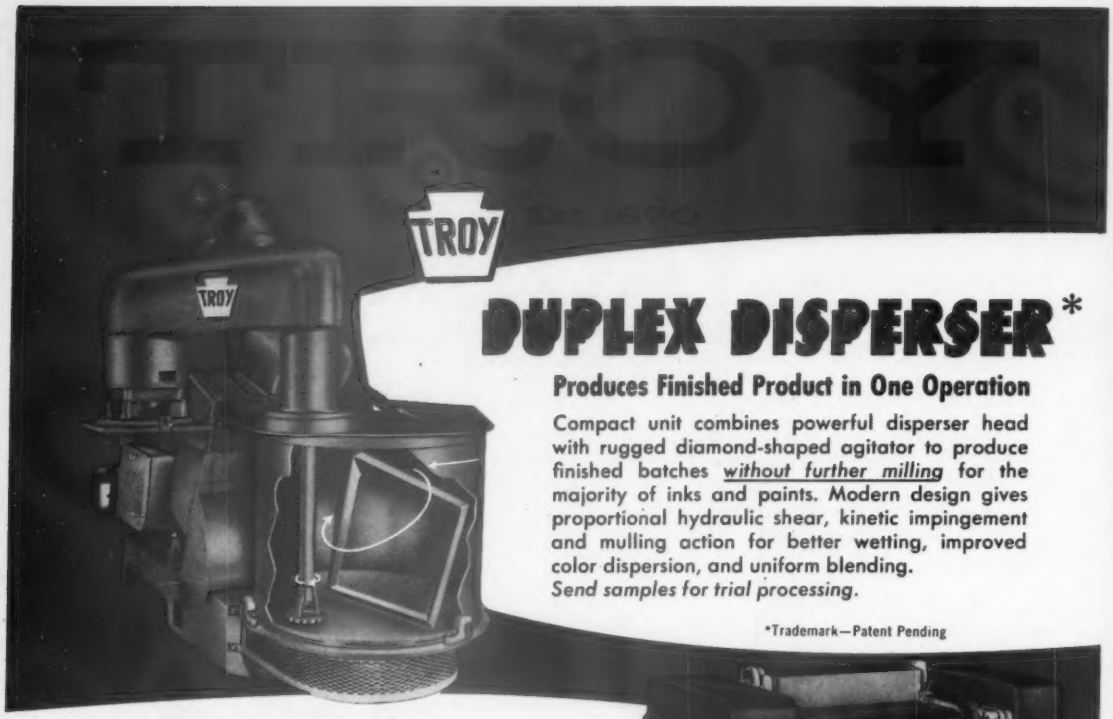

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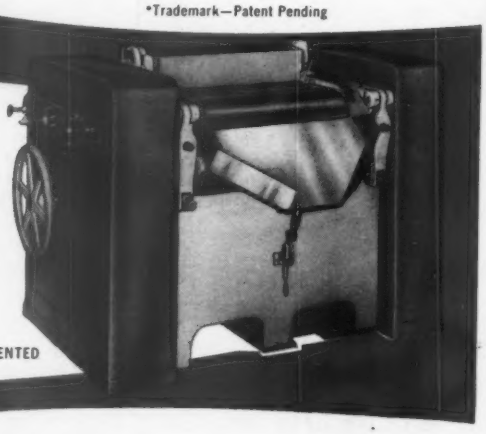

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